
AMERICAN
BRASS
&
COPPER
CO

Catalogue

No. 580

This catalogue is issued to:

MR.....

TITLE.....

COMPANY.....

ADDRESS.....

✦

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CATALOGUE "36"

AMERICAN BRASS & COPPER CO.

EVERYTHING IN METAL SUPPLIES

Distributors of

METALS OF QUALITY

METAL ACCESSORIES

SHOP SUPPLIES

SAN FRANCISCO

557 Market Street
Phone GArfield 2614

OAKLAND

383 Seventh Street
Phone HIgate 2366

From the press of
LEDERER, STREET & ZEUS CO., INC.
Berkeley, California

FOREWORD

THIS CATALOGUE, representing our stock of quality merchandise, which is one of the largest on the Pacific Coast, is born of our desire to anticipate your needs and to be able to suggest to you the best in Metals. We have endeavored to describe and illustrate as com pletely as possible the many items we carry in stock. We have also included many valuable reference tables and other general information that will be of assistance to the purchasing agent, engineer and mechanic. Every effort is made to keep our stock complete and ready for prompt delivery. An invitation is extended to you to visit our warehouse and see our stock of metals and accessories. It is in appreciation of the past cordial business relations with our customers, and in anticipation of our future new friends and the service we may render both, that we are happy to commend to you this catalogue.

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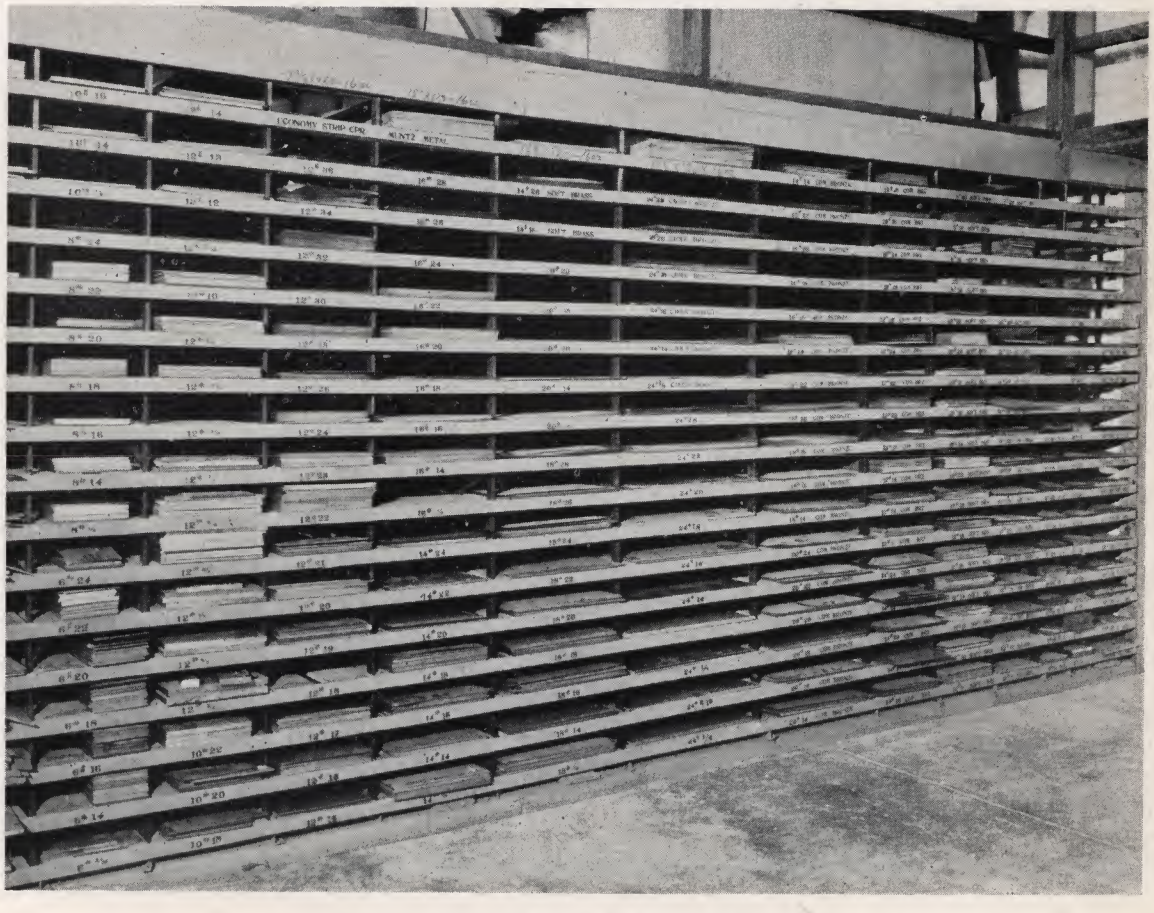
AMERICAN BRASS & COPPER COMPANY

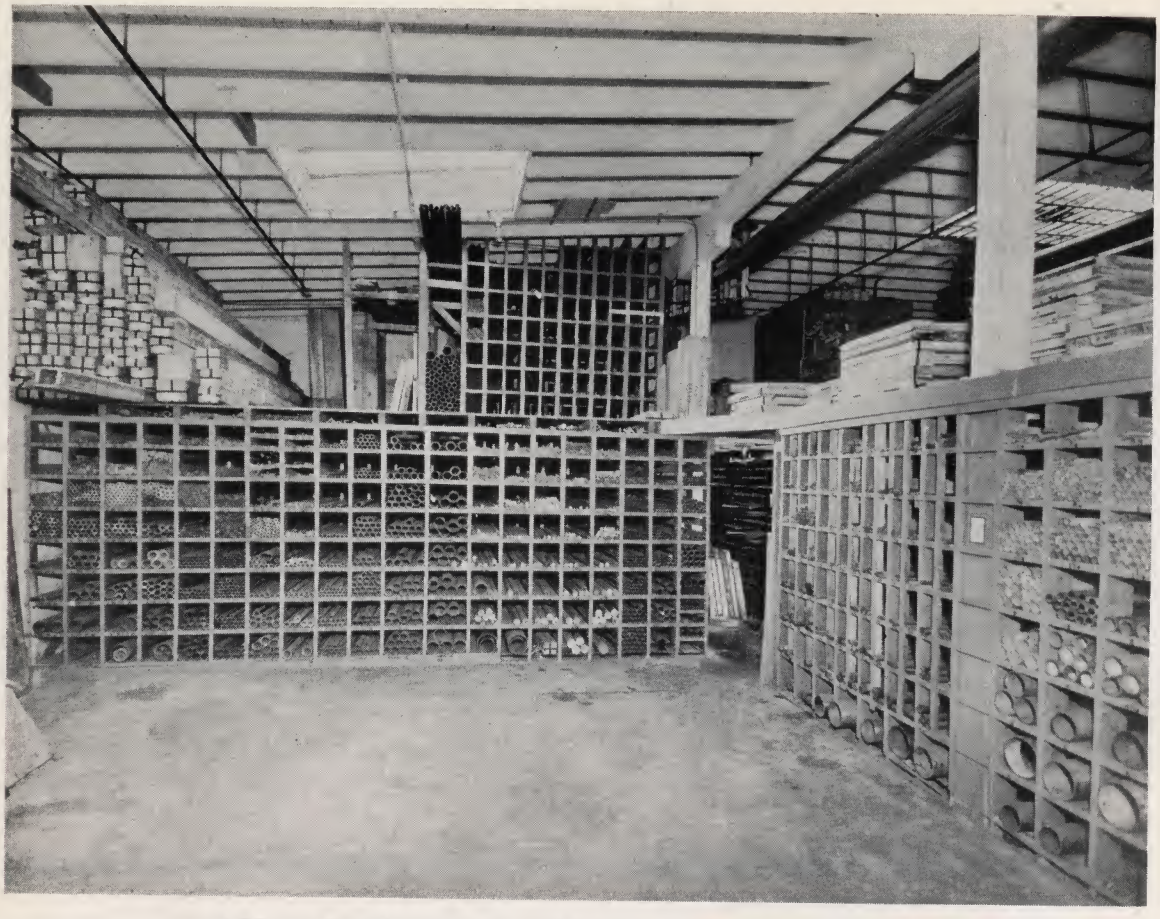
MAIN OFFICE AND WAREHOUSE - OAKLAND, CALIFORNIA

A SECTION OF OUR AUTOMOTIVE AND REFRIGERATION FITTING DEPARTMENT

GENERAL VIEW OF WAREHOUSE WITH COUNTER TO THE RIGHT AND A PORTION OF OUR STOCK OF SHEET AND ROLL COPPER ON LEFT



VIEW OF RACKS FOR FLAT SHEET BRASS



PART OF TOBIN BRONZE, PIPE AND TUBING DEPARTMENT

View of warehouse with portion of Sheet Copper stock in foreground. Such ample stocks make our *"Immediate Delivery"* possible.

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RIVETS

Material:	Aluminum	Brass	Copper	Duralumin	Iron & Steel	Stainless Steel
Type						
Belt	....	....	79	....	....	....
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Allegheny Stainless Steels

Allegheny corrosion resistant and heat resistant Stainless Steels are produced in form of sheet, plate, rod, wire, tubing, and pipe, as well as fabrication accessories such as bolts, nuts, rivets, wood screws, machine screws, cap screws, etc. These steels are produced in a variety of chemical compositions to best serve a particular purpose such as high corrosion resistance to acids, salts, or organic substances; permanent high polished surface; and high tensil strength and resistance to oxidation, even at high temperatures.

ALLEGHENY METAL—18% Chromium-8% Nickel Stainless Steel, combines maximum resistance to corrosion with ease of fabrication, strength, and permanent beauty of surface. It is a pioneer in the stainless field, being particularly well adapted for such purposes as hotel and restaurant equipment, machinery and containers handling milk and milk products, food cookers and preparation machinery, tap room and soda fountain equipment, chemical processing machinery, hospital and clinic equipment, and ornamental and corrosion resistant uses in building construction.

We carry a complete stock of **ALLEGHENY METAL** in various forms detailed elsewhere in this catalogue as indicated by the following index. Please consult us on special sizes not listed, or special technical requirements that can be handled by Allegheny Stainless Steels of other composition or special temper specifications on mill production.

For Welding and Fabricating Technique see pages 227 to 231.
For Chemical Composition and Physical Properties see pages 232 and 233.

ALLEGHENY 22—A stainless steel of higher chrome-nickel content, affording increased resistance to chemical corrosion and heat, combined with ease of fabrication.

ALLEGHENY 44—Still higher in chrome-nickel content, stainless steel of great strength and workability . . . resists oxidation up to 2000°F.

ALLEGHENY 46—4% to 6% chromium steel. Strong at elevated temperatures. Easy to fabricate. Oxidation resistant up to 1200°F., also corrosion resistant. Can be supplied in modified analysis.

ALLEGHENY 33—12% to 14% chromium stainless steel, amenable to heat treatment, possessing high impact values and resistance to abrasion. Resists oxidation up to 1500°F. Can also be offered as a modified non-hardening type.

ALLEGHENY 66—16% to 18% chromium stainless steel, similar in nature to ALLEGHENY 33, but more highly corrosion and heat resistant. Offered in a modified, non-hardening type.

ALLEGHENY 55—23% to 30% chromium stainless steel, resisting oxidation up to 2150°F. Excellent for installations not involving difficult fabrication.

ALLEGHENY STAINLESS STEELS cover a wide range of chemical composition, within which may be found a stainless steel for almost every purpose. These steels may be divided into three groups, the members of each group having similar characteristics.

GROUP No. 1—THE AUSTENITIC STEELS, composed chiefly of chromium, nickel, iron and manganese. These steels are non-magnetic and cannot be hardened by heat treatment. In the annealed condition they are relatively stiff, but extremely ductile. All of these steels harden excessively when worked either hot or cold. ALLEGHENY METAL, A, B and C, MO, TI, Free Machining quality, and ALLEGHENY 2520, ALLEGHENY 22 and ALLEGHENY 44 belong to this group.

GROUP NO. 2—THE MARTENSITIC STEELS composed mainly of chromium, iron, and carbon. These steels are magnetic and can be hardened and tempered by heat treatment in the same manner as ordinary carbon steels, except that these steels air harden intensely when cooled in air. ALLEGHENY 33, 46 and 66 belong to this group.

GROUP NO. 3—THE FERRITIC STEELS. These steels contain chromium in excess of 18%, are non-hardening, and therefore cannot be heat treated. When properly annealed they are relatively strong and quite ductile. ALLEGHENY 67 and ALLEGHENY 55 belong to this group.

Our mill expert will be glad to help you or your engineers with any problem in Stainless Steel. Just ask for our Allegheny technical Engineer.

ROUND BRASS RODS

Free Cutting—Random Lengths—About 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth.
3/32	.0254	.3048
1/8	.0452	.5424
5/32	.0706	.8472
3/16	.1019	1.222
7/32	.1385	1.662
1/4	.1811	2.173
9/32	.2290	2.748
5/16	.2829	3.394
11/32	.3420	4.104
3/8	.4074	4.888
13/32	.4776	5.731
7/16	.5546	6.655
15/32	.6359	7.631
1/2	.7243	8.691
17/32	.8167	9.800
9/16	.9167	11.00
19/32	1.020	12.24
5/8	1.132	13.58
11/16	1.369	16.42
3/4	1.630	19.56
13/16	1.913	22.95
7/8	2.218	26.61
15/16	2.546	30.55
1	2.897	34.76
1 1/16	3.271	39.25
1 1/8	3.667	44.00
1 3/16	4.086	49.03
1 1/4	4.527	54.32
1 5/16	4.991	59.89
1 3/8	5.478	65.74
1 7/16	5.987	71.84
1 1/2	6.519	78.23
1 9/16	7.073	84.87
1 5/8	7.651	91.81
1 11/16	8.250	99.00
1 3/4	8.873	106.47
1 13/16	9.518	114.22
1 7/8	10.19	122.28
2	11.59	139.08
2 1/8	13.08	156.96
2 1/4	14.67	176.04
2 3/8	16.34	196.08
2 1/2	18.11	217.32
2 5/8	19.96	239.52
2 3/4	21.91	262.92
3	26.08	312.96
3 1/4	30.60	367.20
3 1/2	35.49	425.88
4	46.00	552.00
4 1/2	58.68	704.16
5	72.44	869.28

BRASS DRILL RODS

Free Cutting—Lengths 3 Feet

Gauge No.	Decimal Inch	Weight Lin. Ft.
1	.228	.150
2	.221	.139
3	.213	.130
4	.209	.124
5	.205	.121
6	.204	.117
7	.201	.115
8	.199	.113
9	.196	.109
10	.193	.106
11	.191	.102
12	.189	.099
13	.185	.096
14	.182	.094
15	.180	.092
16	.177	.089
17	.173	.086
18	.169	.082
19	.166	.078
20	.161	.075
21	.159	.072
22	.157	.070
23	.154	.068
24	.152	.066
25	.149	.064
26	.147	.062
27	.144	.059
28	.140	.056
29	.136	.052
30	.128	.047
31	.120	.042
32	.116	.038
33	.113	.036
34	.111	.035
35	.110	.034
36	.106	.033
37	.104	.031
38	.101	.030
39	.099	.028
40	.098	.027
41	.096	.026
42	.093	.025
43	.089	.023
44	.086	.021
45	.082	.019
46	.081	.018
47	.078	.017
48	.076	.016
49	.073	.015
50	.070	.014
51	.067	.013
52	.063	.012

HEXAGON BRASS RODS

Free Cutting—Lengths about 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth.
3/16	.1123	1.348
7/32	.1552	18.62
1/4	.1997	2.396
5/16	.3120	3.744
3/8	.4493	5.392
7/16	.6115	7.338
1/2	.7987	9.584
9/16	1.011	12.13
5/8	1.248	14.97
11/16	1.510	18.12
3/4	1.797	21.56
13/16	2.109	25.31
7/8	2.446	29.35
15/16	2.808	33.69
1	3.195	38.34
1 1/16	3.607	43.28
1 1/8	4.043	48.51
1 3/16	4.505	54.06
1 1/4	4.992	59.90
1 5/16	5.503	66.03
1 3/8	6.040	72.48
1 7/16	6.602	79.22
1 1/2	7.188	86.26
1 5/8	8.436	101.23
1 3/4	9.784	117.40
1 7/8	11.23	134.76
2	12.78	153.36
2 1/8	14.43	173.16
2 1/4	16.17	194.04
2 1/2	19.97	239.64
3	28.75	345.00
3 1/2	39.15	469.80
4	51.10	613.20

Square Brass Rods

Free Cutting—Lengths about 12 Feet

Size Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth.
1/8	.0576	.6912
5/32	.0900	1.080
3/16	.1297	1.556
1/4	.2306	2.767
5/16	.3602	4.322
3/8	.5188	6.226
7/16	.7061	8.473
1/2	.9222	11.066
5/8	1.441	17.292
3/4	2.075	24.90
7/8	2.824	33.88
1	3.689	44.26
1 1/8	4.669	56.02
1 1/4	5.764	69.16
1 3/8	6.974	83.68
1 1/2	8.300	99.60
1 5/8	9.741	116.89
1 3/4	11.30	135.60
2	14.76	177.12
2 1/4	18.67	224.04
2 1/2	23.05	276.60

Rectangular Brass Rods

Random Lengths—About 12 Feet

Size Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/16 x 3/16	.0433	.519
1/4	.0576	.691
3/8	.0866	1.039
1/2	.1153	1.383
5/8	.1441	1.729
3/4	.1720	2.064
7/8	.2017	2.420
1	.2306	2.767
1 1/8	.2594	3.112
1 1/4	.2882	3.458
1 1/2	.3458	4.149
1 3/4	.4035	4.842
2	.4611	5.533
2 1/2	.5764	6.916
3	.6917	8.300
3/32 x 1/4	.0866	1.039
5/16	.108	1.296
3/8	.1297	1.556
1/2	.1729	2.074
5/8	.2161	2.593
3/4	.2594	3.112
7/8	.3026	3.631
1	.3458	4.149
1 1/8	.3891	4.669
1 1/4	.4323	5.187
1 1/2	.5187	6.224
1 3/4	.6057	7.268
2	.6917	8.300
2 1/2	.8646	10.375
3	1.0375	12.450
1/8 x 1/4	.1153	1.383
3/8	.1729	2.074
1/2	.2306	2.767
5/8	.2882	3.458
3/4	.3458	4.149
7/8	.4035	4.842
1	.4611	5.533
1 1/8	.5187	6.224
1 1/4	.5763	6.916
1 1/2	.6917	8.300
1 3/4	.8069	9.682
2	.9222	11.066
2 1/2	1.155	13.860
3	1.383	16.60
3/16 x 1/4	.1729	2.074
3/8	.2594	3.112
1/2	.3458	4.149
5/8	.4323	5.187
3/4	.5188	6.225
7/8	.6057	7.268
1	.6917	8.300
1 1/8	.7790	9.348
1 1/4	.8646	10.375
1 1/2	1.0375	12.450
1 3/4	1.2104	14.525
2	1.3833	16.59
2 1/2	1.7292	20.75
3	2.0750	24.90
1/4 x 3/8	.3458	4.149
1/2	.4611	5.533
5/8	.5764	6.916
3/4	.6917	8.300
7/8	.8069	9.682
1	.9222	11.06
1 1/8	1.0375	12.45
1 1/4	1.1528	13.83
1 1/2	1.3833	16.59
1 3/4	1.6139	19.37
2	1.8444	22.13
2 1/2	2.3056	27.67
3	2.7666	33.19
5/16 x 3/8	.4323	5.187
1/2	.5764	6.916
5/8	.7205	8.646
3/4	.8647	10.37
7/8	1.0087	12.10
1	1.1528	13.83
1 1/8	1.2968	15.56
1 1/4	1.4409	17.29
1 1/2	1.7291	20.74
1 3/4	2.0173	24.20
2	2.3055	27.66
2 1/2	2.8818	34.58
3	3.4582	41.49
3/8 x 1/2	.6917	8.30
5/8	.8646	10.37
3/4	1.0375	12.45
7/8	1.2104	14.52
1	1.3833	16.59
1 1/8	1.5563	18.67
1 1/4	1.7291	20.74
1 1/2	2.075	24.90
1 3/4	2.4208	29.04
2	2.7666	33.19
2 1/2	3.4582	41.49
3	4.1500	49.80
1/2 x 5/8	1.153	13.83
3/4	1.3833	16.59
7/8	1.6139	19.36
1	1.8444	22.13
1 1/8	2.0750	24.90
1 1/4	2.3055	27.66
1 1/2	2.7666	33.19
1 3/4	3.2278	38.73
2	3.6888	44.26
2 1/2	4.6110	55.33
3	5.5332	66.39
5/8 x 3/4	1.7290	20.74
7/8	2.0173	24.20
1	2.3055	27.66
1 1/8	2.5937	31.12
1 1/4	2.8819	34.58
1 1/2	3.4582	41.49
1 3/4	4.0347	48.41
2	4.6110	55.33
2 1/2	5.7638	69.17
3	6.9166	82.99
3/4 x 7/8	2.4208	29.04
1	2.7666	33.19
1 1/8	3.1124	37.34
1 1/4	3.4583	41.49
1 1/2	4.1499	49.79
1 3/4	4.8416	58.09
2	5.5332	66.39
2 1/2	6.9166	82.99
3	8.2998	99.59

Half Round Brass Rods

Random Lengths about 12 Feet

Inches Across Flat	Inch Thick	Wght Lineal Foot	Wght Per 12 Feet	Inches Across Flat	Inch Thick	Wght Lineal Foot	Wght Per 12 Feet	Inches Across Flat	Inch Thick	Wght Lineal Foot	Wght Per 12 Feet
3/16	3/32	.050	.600	7/16	7/32	.277	3.32	7/8	7/16	1.10	13.20
1/4	1/8	.090	1.08	1/2	1/4	.362	4.34	1	1/2	1.44	17.28
5/16	5/32	.141	1.69	5/8	5/16	.566	6.79	1 1/4	5/8	2.26	27.12
3/8	3/16	.203	2.43	3/4	3/8	.815	9.78	1 1/2	3/4	3.25	39.00
								2	1	5.80	69.60

Half Oval Brass Rods

Inches Across Flat	Inch Thick	Wght Lineal Foot	Wght Per 12 Feet	Inches Across Flat	Inch Thick	Wght Lineal Foot	Wght Per 12 Feet	Inches Across Flat	Inch Thick	Wght Lineal Foot	Wght Per 12 Feet
3/8	3/32	.100	1.20	3/4	3/16	.3776	4.53	1	1/4	.661	7.94
1/2	1/8	.161	1.93	3/4	1/4	.505	6.06	1 1/4	5/16	1.00	12.00
5/8	5/32	.259	3.11	7/8	7/32	.549	6.58	1 1/2	3/8	1.50	18.00
5/8	3/16	.3177	3.81	7/8	1/4	.5840	7.01				

Brass Angles—Drawn

Lengths about 12 Feet

Brown & Sharpe Gauge

Thickness or Gauge	Side Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lg.
1/8	3/4 x 3/4	.634	7.61
1/8	1 x1	.865	10.38
1/8	1 1/4 x1 1/4	1.095	13.14
1/8	1 1/2 x1 1/2	1.326	15.91
1/8	2 x2	1.787	21.44
14	1/2 x 1/2	.221	2.65
14	3/4 x 3/4	.339	4.07

Two Sides Equal Dimensions

Thickness or Gauge	Side Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lg.
14	1 x1	.457	5.48
14	1 1/4 x1 1/4	.574	6.89
14	2 x2	.931	11.17
18	1/4 x 1/4	.068	.82
18	3/8 x 3/8	.106	1.27
18	1/2 x 1/2	.142	1.70
18	5/8 x 5/8	.178	2.14
18	3/4 x 3/4	.215	2.58
18	7/8 x 7/8	.253	3.04
18	1 x1	.288	3.46
18	1 1/4 x1 1/4	.365	4.38
18	1 1/2 x1 1/2	.440	5.28
18	2 x2	.590	7.08

Brass Channels—Drawn

About 12 Feet Long

Brown & Sharpe Gauge

Width Inch	Sides Inch	Gauge No.	Weight Lin. Ft.
1/4	3/16	22	.0536
3/8	1/4	18	.1175

Two Sides Equal Dimensions

Width Inch	Sides Inch	Gauge No.	Weight Lin. Ft.
1/2	3/8	18	.1740
5/8	3/8	18	.1920
5/8	5/8	18	.2660
3/4	3/8	18	.2110
11/16	13/32	14	.3248

Aluminum Angles and Mouldings

No. 43S Alloy Extruded Angles

Die. No.	Size	Weight Per Lin. Ft.
79—A	3/4 x 3/4 x1/8	.210
79—G	1 x1 x1/8	.275
79—Q	2 x2 x3/16	.857

Inquiries for additional shapes and sizes receive special attention.

Aluminum Body Mouldings

Die. No.	Size	Weight Per Lin. Ft.
74—A	3/16 x 5/8	.107
74—B	3/16 x 3/4	.117
74—E	1/4 x 7/8	.186
74—D	1/4 x1	.228

Round Copper Rods

Hard Drawn—About 12 Foot Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/16	.0118	.141
1/8	.04730	.567
3/16	.1065	1.278
1/4	.1894	2.273
5/16	.2959	3.551
3/8	.4261	5.113
7/16	.5800	6.960
1/2	.7576	9.091
9/16	.9588	11.51
5/8	1.184	14.21
3/4	1.705	20.46
7/8	2.320	27.84
15/16	2.663	31.96
1	3.030	36.36
1 1/8	3.835	46.02
1 1/4	4.735	56.82
1 5/16	5.22	62.64
1 3/8	5.729	68.74
1 1/2	6.818	81.82
1 3/4	9.281	111.37
2	12.12	145.4
2 1/4	15.34	184.0
2 1/2	18.94	227.2
3	27.27	327.2

Round Copper Rods

Soft Drawn--About 12 Foot Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/4	.1894	2.273
5/16	.2959	3.551
3/8	.4261	5.113
1/2	.7576	9.091
5/8	1.184	14.21
3/4	1.705	20.46
7/8	2.320	27.84
1	3.030	36.36
1 1/8	3.835	46.02
1 1/4	4.735	56.82
1 1/2	6.818	81.82
1 3/4	9.281	111.37
2	12.12	145.44

Hexagon Copper Rods

Hard Drawn—About 12 Foot Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/4	.2088	2.51
3/8	.4699	5.64
1/2	.8354	10.02
5/8	1.305	15.66
3/4	1.880	22.56
7/8	2.558	30.70
1	3.341	40.09
1 1/4	5.221	62.65
1 1/2	7.518	90.22
1 3/4	10.23	122.76
2	13.37	160.44

Square Copper Rods

Hard Drawn—About 12 Foot Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/8	.0602	.722
3/16	.1356	1.627
1/4	.2412	2.894
5/16	.3768	4.522
3/8	.5426	6.511
7/16	.7386	8.863
1/2	.9646	11.58
5/8	1.507	18.08
3/4	2.170	26.04
7/8	2.954	35.45
1	3.858	46.30
1 1/4	6.029	72.35
1 1/2	8.681	104.17
2	15.43	185.16

Rectangular Copper Rods (Bus Bar)

Hard Drawn—About 12 Foot Lengths

Thick Inch	Width Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/64 x	3/8	.0709	.85
	1/2	.0945	1.13
	3/4	.1418	1.70
	1	.1890	2.27
1/16 x	3/8	.0904	1.08
	1/2	.1206	1.45
	5/8	.1507	1.81
	3/4	.1809	2.17
	13/16	.1960	2.35
	7/8	.2110	2.53
	1	.2412	2.89
	1 1/4	.3014	3.62
	1 1/2	.3617	4.34
	1 3/4	.4227	5.07
	2	.4824	5.79
	2 1/2	.6028	7.23
	3	.7234	8.68
5/64 x	1/2	.1543	1.85
3/32 x	1/8	.0452	.54
	3/8	.1356	1.63
	1/2	.1809	2.17
	5/8	.2261	2.71
	3/4	.2713	3.26
	7/8	.3165	3.80
	1	.3617	4.34
	1 1/4	.4522	5.43
	1 1/2	.5426	6.51
	1 3/4	.6330	7.60
	2	.7235	8.68
	2 1/2	.9044	10.85
	3	1.085	13.02
	4	1.447	17.36
1/8 x	1/4	.1206	1.45
	3/8	.1810	2.17
	1/2	.2412	2.89
	5/8	.3014	3.62
	3/4	.3617	4.34
	7/8	.4220	5.06
	1	.4823	5.78
	1 1/4	.6029	7.23
	1 1/2	.7235	8.68
	1 3/4	.8440	10.13
	2	.9646	11.58
	2 1/2	1.206	14.47
	3	1.447	17.36
	4	1.929	23.14
3/16 x	3/8	.2713	3.25
	1/2	.3617	4.34
	5/8	.4522	5.42
	3/4	.5426	6.51
	7/8	.6330	7.59
	1	.7235	8.68
	1 1/4	.9043	10.85
	1 1/2	1.085	13.02
	1 3/4	1.266	15.19
	2	1.447	17.36
	2 1/2	1.808	21.69
	3	2.169	26.03
1/4 x	3/8	.3619	4.34
	1/2	.4823	5.78
	5/8	.6029	7.23
	3/4	.7235	8.68
	7/8	.8440	10.12
	1	.9646	11.57
	1 1/4	1.206	14.47
1/4 x	1 1/2	1.447	17.36
	1 3/4	1.688	20.25
	2	1.929	23.14
	2 1/2	2.412	28.94
	3	2.894	34.72
	4	3.858	46.29
	5	4.823	57.87
	6	5.787	69.44
3/8 x	3/4	1.085	13.02
	1	1.447	17.36
	1 1/4	1.809	21.70
	1 1/2	2.170	26.04
	1 3/4	2.53	30.36
	2	2.894	34.72
	2 1/2	3.617	43.40
	3	4.340	52.08
	4	5.788	69.45
	5	7.235	86.82
	6	8.681	104.17
1/2 x	1	1.929	23.14
	1 1/4	2.412	28.94
	1 1/2	2.894	34.72
	1 3/4	3.376	40.51
	2	3.858	46.29
	2 1/2	4.823	57.87
	3	5.788	69.45
	4	7.717	92.60
	5	9.646	115.75
	6	11.58	138.96
3/4 x	1 1/2	4.341	52.09
	2	5.788	69.45
	3	8.682	104.18
1 x	4	15.43	185.16

Tobin Bronze

Tobin Bronze is used where great torsional strength and corrosion resistance is required. Especially suitable for Shafting, Pump Piston Rods, and parts exposed to severe weather conditions. Cannot be used as a bearing metal.

Round Tobin Bronze Rods

Lengths—12 to 18 Feet

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/8	.0447	.53
3/16	.1006	1.20
1/4	.1788	2.14
5/16	.2794	3.35
3/8	.4024	4.82
7/16	.5477	6.57
1/2	.7154	8.58
9/16	.9054	10.86
5/8	1.118	13.42
11/16	1.353	16.24
3/4	1.610	19.32
13/16	1.889	22.67
7/8	2.191	26.29
15/16	2.525	30.30
1	2.862	34.34
1 1/16	3.230	38.76
1 1/8	3.622	43.46
1 3/16	4.035	48.42
1 1/4	4.471	53.65
1 5/16	4.929	59.15
1 3/8	5.410	64.92
1 7/16	5.913	70.96
1 1/2	6.438	77.26
1 5/8	7.556	90.67
1 3/4	8.763	105.16
1 7/8	10.06	120.72
1 15/16	10.74	128.88
2	11.45	137.40
2 1/16	12.17	146.04
2 1/8	12.92	155.04
2 3/16	13.69	164.28
2 1/4	14.49	173.88
2 3/8	16.14	193.68
2 1/2	17.88	214.56
2 5/8	19.72	236.64
2 3/4	21.64	259.68
2 7/8	23.65	283.80
3	25.75	309.00

Piston Finish Tobin Bronze Rods

Diam. Inch	Wght. Per Ft.	Stock Lgths. Ft.
3 1/4	30.22	10
3 1/2	35.05	10
3 3/4	40.24	10
4	45.78	10
3 1/4	30.22	12
3 1/2	35.05	12
4 1/2	57.75	12
5	71.54	12
3 1/4	30.22	14
3 1/2	35.05	14
3 1/4	30.22	16
3 1/2	35.05	16
3 3/4	40.24	16
4	45.78	16

Hexagon Tobin Bronze Rods

Lengths about 12 Feet

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/4	.1972	2.36
5/16	.3081	3.69
3/8	.4437	5.32
7/16	.6039	7.24
1/2	.7888	9.46
9/16	.9983	11.97
5/8	1.232	14.78
11/16	1.491	17.89
3/4	1.775	21.30
13/16	2.083	24.99
7/8	2.416	28.99
15/16	2.773	33.28
1	3.155	37.86
1 1/16	3.562	42.74
1 1/8	3.993	47.92
1 3/16	4.449	53.39
1 1/4	4.930	59.16
1 3/8	5.965	71.58
1 7/16	6.520	78.24
1 1/2	7.099	85.19
1 5/8	8.332	99.98
1 3/4	9.663	115.96
1 7/8	11.09	133.08
2	12.62	151.44
2 1/4	15.97	191.64
2 1/2	19.72	236.64
3	28.40	340.80

Square Tobin Bronze Rods

Lengths about 12 Feet

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/4	.2277	2.73
5/16	.3558	4.26
3/8	.5124	6.14
7/16	.6974	8.36
1/2	.9108	10.92
5/8	1.423	17.07
3/4	2.049	24.58
7/8	2.789	33.46
1	3.643	43.71
1 1/4	5.693	68.31
1 3/8	6.888	82.65
1 1/2	8.198	98.37
2	14.57	174.84

For Tobin Bronze Welding Rod refer to page 160.

Round Silicon Bronze Rods

A copper silicon alloy, the copper content of which is approximately 96% or a little over. Because of its tensile strength (90,000 pounds per square inch) and its resistance to corrosion, it is being used very largely in marine work.

Random Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
3/16	.1051	1.26
1/4	.1868	2.24
5/16	.2908	3.48
3/8	.4202	5.04
7/16	.5724	6.86
1/2	.7472	8.96
9/16	.9457	11.34
5/8	1.167	14.00
11/16	1.411	16.93
3/4	1.681	20.17
13/16	1.973	23.67
7/8	2.288	27.45
15/16	2.627	31.52
1	2.989	35.86
1 1/16	3.388	40.65
1 1/8	3.781	45.37
1 1/4	4.668	56.01
1 3/8	5.649	67.78
1 1/2	6.725	80.70
1 3/4	9.152	109.82
2	11.96	143.52
2 1/2	18.65	223.80
3	26.91	322.92

Hexagon Silicon Bronze Rods

Random Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
3/8	.4632	5.55
7/16	.6304	7.56
1/2	.8234	9.88
9/16	1.042	12.50
5/8	1.286	15.43
11/16	1.556	18.67
3/4	1.852	22.22
13/16	2.174	26.08
7/8	2.526	30.31
15/16	2.898	34.77
1	3.294	39.52
1 1/16	3.718	44.61
1 1/8	4.168	50.01
1 1/4	5.146	61.75
1 3/8	6.227	74.72
1 7/16	6.806	81.67
1 1/2	7.410	88.92
1 5/8	8.699	104.38
1 3/4	10.08	120.96
2	13.17	158.04

Square Silicon Bronze Rods

Random Lengths

Diam. Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/4	.2377	2.85
3/8	.5348	6.41
1/2	.9507	11.40
5/8	1.485	17.82
3/4	2.139	25.66
7/8	2.901	34.81
1	3.788	45.46
1 1/4	5.925	71.10
1 1/2	8.523	102.28

Round Phosphor Bronze Rods

Random Lengths

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/8	.047	.56
3/16	.106	1.27
1/4	.189	2.26
5/16	.296	3.55
3/8	.426	5.11
7/16	.580	6.96
1/2	.758	9.09
9/16	.958	11.49
5/8	1.18	14.16
3/4	1.70	20.40
7/8	2.32	27.84
1	3.03	36.36
1 1/8	3.84	46.08
1 1/4	4.74	56.88
1 3/8	5.73	68.76
1 1/2	6.82	81.84
1 5/8	8.00	96.00
1 3/4	9.28	111.36
2	12.12	145.44

Hexagon Phosphor Bronze Rods

Hard Drawn—Random Lengths 8 to 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/4	1.880	22.56
7/8	2.563	30.76
1	3.341	40.09
1 1/4	5.221	62.65
1 1/2	7.518	90.21
2	13.37	160.44

Round Nickel Silver Rods

18 Per Cent

Hard Drawn—Lengths about 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/8	.04527	.543
5/32	.07300	.876
3/16	.1019	1.22
7/32	.140	1.68
1/4	.1811	2.17
5/16	.2829	3.39
3/8	.4073	4.88
7/16	.5546	6.65
1/2	.7243	8.69
5/8	1.132	13.58
3/4	1.630	19.56
7/8	2.218	26.61
1	2.897	34.76

Round Commercial Bronze Rods

Commercial Bronze has a very high content of copper which gives a rich golden color—is used largely for ornamental work.

Lengths about 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
¼	.1875	2.25
⅜	.422	5.06
½	.750	9.00
⅝	1.172	14.06
¾	1.698	20.38
⅞	2.297	27.56
1	3.00	36.00

Square Commercial Bronze Rods

Lengths about 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
5/16	.373	4.48
⅜	.538	6.46
½	.955	11.46
⅝	1.492	17.90
¾	2.149	25.79

Rectangular Commercial Bronze Rods

Lengths about 12 Feet

Size Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛ x ½	.240	2.88
¾	.359	4.31
1	.480	5.76
1¼	.600	7.20
1½	.720	8.64
2	.960	11.52
3/16x ½	.359	4.31
¾	.540	6.48
⅞	.630	7.56
1	.720	8.64
1¼	.900	10.80
3/16x1½	1.080	12.96
2	1.440	17.28
¼ x ½	.480	5.76
¾	.720	8.64
⅞	.840	10.08
1	.959	11.51
1¼	1.199	14.39
1½	1.440	17.28
2	1.919	23.03
⅜ x ½	.720	8.64
⅝	.899	10.79
⅜ x ¾	1.079	12.95
⅞	1.259	15.11
1	1.440	17.28
1¼	1.799	21.58
1½	2.158	25.90
2	2.898	34.78
½ x ¾	1.440	17.28
1	1.919	23.03
1¼	2.399	28.78
1½	2.878	34.54
2	3.841	46.09

Round Aluminum Rod

(Commercially Pure Aluminum)

Temper Designation 2S4—Half Hard

Lengths 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛	.013	.156
3/16	.032	.38
¼	.057	.68
5/16	.090	1.08
⅜	.130	1.56
7/16	.177	2.12
½	.231	2.77
⅝	.360	4.32
¾	.519	6.23
⅞	.706	8.47
1	.923	11.08

Square Aluminum Rod

Temper Designation 2S4—Half Hard

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/16	.0413	.50
¼	.079	.95
5/16	.114	1.37
⅜	.165	1.98
7/16	.225	2.70
½	.294	3.53
⅝	.459	5.51
¾	.661	7.93
⅞	.899	10.79
1	1.18	14.16

Round Duralumin Rods (Aluminum Alloy)

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/16	.0051	.0612
3/32	.0081	.0972
1/8	.014	.168
3/16	.033	.396
1/4	.06	.720
5/16	.093	1.11
3/8	.133	1.59
7/16	.181	2.17
1/2	.237	2.84
9/16	.292	3.50
5/8	.371	4.45
3/4	.534	6.408
7/8	.726	8.71
1	.950	11.40
1 1/8	1.20	14.40
1 1/4	1.48	17.76
1 3/8	1.80	21.60
1 1/2	2.14	25.68
1 5/8	2.51	30.12
1 3/4	2.91	34.92
1 7/8	3.34	40.08
2	3.80	45.60
2 1/8	4.29	51.48
2 1/4	4.81	57.72
2 3/8	5.36	64.32
2 1/2	5.94	71.28

Temper Designation 17ST

Lengths about 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
2 5/8	6.50	78.00
2 3/4	7.10	85.20
2 7/8	7.90	94.80
3	8.55	102.6
3 1/4	10.04	120.4
3 1/2	11.64	139.6
3 3/4	13.36	160.3
4	15.21	182.5
4 1/4	17.17	206.0
4 1/2	19.24	230.8
4 3/4	21.60	259.2
5	23.70	284.4

Hexagon Duralumin Rods

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/4	.0631	.757
5/16	.039	1.18
3/8	.147	1.76
7/16	.194	2.32
1/2	.262	3.14
9/16	.331	3.97
5/8	.397	4.76
3/4	.590	7.08
7/8	.802	9.62
15/16	.893	10.71
1	1.05	12.60
1 1/16	1.14	13.68

Temper Designation 17ST

Lengths 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1 1/8	1.33	15.96
1 1/4	1.64	19.68
1 3/8	1.98	23.76
1 1/2	2.35	28.20
1 3/4	3.21	38.52
2	4.19	50.28

Square Duralumin Rods

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/16	.043	.516
1/4	.075	.900
5/16	.118	1.41
3/8	.170	2.04
7/16	.231	2.77
1/2	.302	3.62
5/8	.471	5.65
3/4	.679	8.14
7/8	.925	11.10
1	1.21	14.52

Temper Designation 17ST

Lengths 12 Feet

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1 1/4	1.89	22.68
1 1/2	2.73	32.76
1 3/4	3.74	44.88
2	4.90	58.80
2 1/2	7.56	90.72
3	10.89	130.68

Rectangular Duralumin Rod

Size Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/8 x 1/4	.0378	.4536
3/8	.0567	.680
1/2	.0755	.906
5/8	.0946	1.135
3/4	.1130	1.35
1	.1500	1.80
1 1/4	.1880	2.26
1 1/2	.2260	2.72
2	.3010	3.62
3/16x 1/2	.1130	1.35
5/8	.141	1.69
3/4	.169	2.03
1	.226	2.72
1 1/4	.282	3.38
1 1/2	.338	4.06
1 3/4	.397	4.76
2	.454	5.44
1/4 x 1/2	.150	1.80
3/4	.226	2.72
1	.301	3.62
1 1/4	.378	4.54
1 1/2	.454	5.44
1 3/4	.529	6.35
2	.605	7.26
2 1/4	.681	8.17
2 1/2	.756	9.07
2 3/4	.832	9.98
3	.908	10.89
5/16 x 3/4	.282	3.38
1	.378	4.54
1 1/4	.471	5.65
1 1/2	.567	6.80
2	.756	9.07
2 1/2	.945	11.34
3	1.134	13.60

Temper Designation 17ST

Lengths 12 Feet

Size Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/8 x 3/4	.338	4.06
1	.454	5.44
1 1/4	.564	6.76
1 1/2	.677	8.12
1 3/4	.794	9.53
2	.907	10.88
2 1/2	1.13	13.56
3	1.36	16.32
1/2 x 5/8	.376	4.52
3/4	.451	5.42
7/8	.530	6.36
1	.601	7.21
1 1/4	.752	9.02
1 1/2	.902	10.82
1 3/4	1.05	12.60
2	1.20	14.40
2 1/2	1.51	18.12
3	1.82	21.84
3 1/2	2.12	25.44
4	2.42	29.04

Stainless Steel Bars

18 & 8 CHROMIUM—NICKEL
ALLEGHENY METAL—FREE MACHINING

Stainless Type No. 303

ROUND—GROUND FINISH—ANNEALED

Free Machining—Stock Lengths Random 12′ to 20′

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/32	.023	.276	5/8	1.05	12.60	1 3/16	3.76	45.12
1/8	.042	.504	11/16	1.27	15.24	1 1/4	4.17	50.04
3/16	.094	1.128	3/4	1.51	18.12	1 3/8	5.02	60.24
1/4	.168	2.016	7/8	2.06	24.72	1 1/2	6.01	72.12
5/16	.262	3.144	15/16	2.36	28.32	1 5/8	7.05	84.60
3/8	.378	4.536	1	2.68	32.16	1 3/4	8.18	98.16
7/16	.514	6.168	1 1/16	3.01	36.12	2	10.68	128.16
1/2	.671	8.052	1 1/8	3.38	40.56			

ROUND—COLD DRAWN—ANNEALED

Free Machining—Stock Lengths Random 12′ to 20′

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
3/32	.023	.276	5/8	1.05	12.60	1 3/16	3.76	45.12
1/8	.042	.504	11/16	1.27	15.24	1 1/4	4.17	50.04
3/16	.094	1.128	3/4	1.51	18.12	1 3/8	5.02	60.24
1/4	.168	2.016	7/8	2.06	24.72	1 1/2	6.01	72.12
5/16	.262	3.144	15/16	2.36	28.32	1 5/8	7.05	84.60
3/8	.378	4.536	1	2.68	32.16	1 3/4	8.18	98.16
7/16	.514	6.168	1 1/16	3.01	36.12	2	10.68	128.16
1/2	.671	8.052	1 1/8	3.38	40.56			

HEXAGON—COLD DRAWN—ANNEALED

Free Machining—Stock Lengths Random 12′ to 20′

Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Diam. Inch	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
1/4	.184	2.208	3/4	1.66	19.92	1 3/8	5.57	66.84
3/8	.414	4.968	7/8	2.25	27.00	1 7/16	6.08	72.96
1/2	.736	8.832	1	2.94	35.28	1 1/2	6.62	79.44
5/8	1.15	13.80	1 1/16	3.32	39.84	1 5/8	7.77	93.24
11/16	1.39	16.68	1 1/8	3.73	44.76	2	11.78	141.36
			1 1/4	4.60	55.20			

RECTANGULAR

ALLEGHENY METAL

White Pickled Finish—Annealed
Stock Lengths 12′ to 20′

Size Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth.
1/4 x1	.850	10.20
1/4 x2	1.70	20.40
5/16x1	1.06	12.72
3/8 x1 1/2	1.92	23.04
3/8 x2	2.55	30.60
1/2 x1 1/2	2.55	30.60
1/2 x2	3.40	40.80

ANGLES

ALLEGHENY METAL

White Pickled Finish—Annealed
Stock Lengths 12′ to 20′

Size Inch	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth.
1 x1 x1/8	.83	9.96
1 1/2x1 1/2x1/8	1.23	14.76
1 1/2x1 1/2x3/16	1.83	21.96
2 x2 x1/4	3.19	38.28

Other alloys of stainless and heat-resisting steels can be furnished promptly. Inquiries receive careful attention.

For Chemical and Physical, see Pages 232, 233.

For other Stainless Steel material and accessories, see index, Page 8.

Sheet Brass—Half Hard

Brown & Sharpe Gauge

Lengths About 8 Feet

Thickness In. or Ga. No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Lgth	Thickness In. or Ga. No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Lgth
SHEETS 4" WIDE							
1/2	.500	7.344	58.75	16	.051	.752	6.02
3/8	.375	5.508	44.06	18	.0403	.594	4.75
1/4	.250	3.672	29.37	20	.0320	.472	3.68
3/16	.1875	2.754	22.03	22	.0253	.373	2.98
1/8	.125	1.836	14.68	24	.0201	.296	2.37
3/32	.0937	1.377	11.01	26	.0159	.2343	1.87
14	.0641	.943	7.54	28	.0126	.1857	1.48
SHEETS 6" WIDE							
1/2	.500	11.01	88.08	16	.051	1.127	9.02
3/8	.375	8.262	66.09	18	.0403	.891	7.13
1/4	.250	5.508	44.06	20	.0320	.707	5.65
3/16	.1875	4.131	33.04	22	.0253	.559	4.47
1/8	.125	2.754	22.03	24	.0201	.444	3.55
3/32	.0937	2.065	16.52	26	.0159	.351	2.80
14	.0641	1.415	11.32	28	.0126	.2785	2.22
SHEETS 8" WIDE							
1/8	.125	3.672	29.37	22	.0253	.746	5.97
14	.0641	1.886	15.09	24	.0201	.592	4.74
16	.051	1.503	12.02	26	.0159	.469	3.75
18	.0403	1.188	9.50	28	.0126	.371	2.97
20	.0320	.943	7.54				
SHEETS 10" WIDE							
1/8	.125	4.589	36.71	22	.0253	.932	7.46
14	.0641	2.358	18.86	24	.0201	.740	5.92
16	.051	1.789	14.31	26	.0159	.586	4.69
18	.0403	1.485	11.88	28	.0126	.464	3.71
20	.0320	1.179	9.43				
SHEETS 12" WIDE							
3/4	.750	33.05	264.4	16	.051	2.238	17.90
5/8	.625	27.54	220.3	17	.0453	1.914	15.31
1/2	.500	22.03	176.2	18	.0403	1.776	14.20
3/8	.375	16.52	132.1	19	.0359	1.582	12.65
5/16	.3125	13.77	110.1	20	.0320	1.408	11.26
1/4	.250	11.02	88.16	21	.0285	1.254	10.03
3/16	.1875	8.262	66.09	22	.0253	1.117	8.94
5/32	.1562	6.885	55.08	23	.0226	.9946	7.96
1/8	.125	5.508	44.06	24	.0201	.8857	7.08
10	.1019	4.490	35.92	26	.0159	.7024	5.62
3/32	.0937	4.131	33.04	28	.0126	.5570	4.46
12	.081	3.560	28.48	30	.0100	.4417	3.53
13	.072	3.173	25.38	32	.0080	.3503	2.80
14	.0641	2.825	22.60	34	.0063	.2778	2.22
15	.0571	2.516	20.12	36	.0050	.2203	1.76
SHEETS 14" WIDE							
1/8	.125	6.425	51.40	20	.0320	1.650	13.20
14	.0641	3.300	26.40	22	.0253	1.304	10.43
16	.051	2.630	21.04	24	.0201	1.036	8.29
18	.0403	2.078	16.62				
SHEETS 16" WIDE							
1/8	.125	7.344	58.75	22	.0253	1.492	11.94
14	.0641	3.772	30.18	24	.0201	1.184	9.47
16	.051	3.006	24.05	26	.0159	.9380	7.50
18	.0403	2.376	19.01	28	.0126	.7420	5.94
20	.0320	1.886	15.09				
SHEETS 18" WIDE							
1/8	.125	8.262	66.09	22	.0253	1.678	13.42
14	.0641	4.244	33.95	24	.0201	1.332	10.66
16	.051	3.382	27.05	26	.0159	1.054	8.43
18	.0403	2.672	21.38	28	.0126	.836	6.69
20	.0320	2.122	16.98				

Brass Sheet—Half Hard

Brown & Sharpe Gauge

Exact Lengths

Thickness In. or Ga. No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per Sheet	Thickness In. or Ga. No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per Sheet
			SHEETS 20"x96"				
1/8	.125	9.178	73.42	18	.0403	2.970	23.76
14	.0641	4.716	37.73	20	.0320	2.358	18.86
16	.0510	3.578	28.62				
			SHEETS 24"x48"				
1/2	.500	44.06	176.2	3/16	.1875	16.52	66.08
3/8	.375	33.05	132.2	1/8	.125	11.02	44.08
5/16	.3125	27.54	110.1	1/16	.0625	5.508	22.03
1/4	.250	22.03	88.12	1/32	.0312	2.754	11.01
			SHEETS 24"x96"				
1/2	.500	44.06	352.5	16	.0510	4.478	35.82
3/8	.375	33.05	264.4	18	.0403	3.552	28.42
5/16	.3125	27.54	220.3	20	.0320	2.816	22.52
1/4	.250	22.03	176.3	22	.0253	2.234	17.87
3/16	.1875	16.52	132.1	24	.0201	1.771	14.16
1/8	.125	11.02	88.16	26	.0159	1.405	11.24
14	.0641	5.648	45.18	28	.0126	1.114	8.91
			SHEETS 30"x96"				
14	.0641	7.07	56.56	18	.0403	4.46	35.68
16	.0510	5.37	42.96				
			SHEETS 36"x96"				
1/2	.500	66.09	528.7	1/8	.125	16.52	132.16
3/8	.375	49.56	396.4	3/32	.0937	12.39	99.12
1/4	.250	33.06	264.4	1/16	.0625	8.26	66.08
3/16	.1875	24.78	198.2	1/32	.0312	4.13	33.04
			SHEETS 48"x96"				
1/4	.250	44.08	352.6	1/16	.0625	11.01	88.08
1/8	.125	22.04	176.3	1/32	.03125	5.50	44.00

Engravers' Brass—Quarter Hard

Sheets about 8 Feet Long

Thickness Inch	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Sheet	Thickness Inch	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Sheet
			SHEETS 12" WIDE				
1/2	.500	22.03	176.24	5/16	.3125	13.77	110.16
7/16	.4375	19.27	154.16	1/4	.250	11.02	88.16
3/8	.375	16.52	132.16				
			SHEETS 14" WIDE				
1/2	.500	25.70	205.60	5/16	.3125	16.06	128.48
7/16	.4375	22.48	179.84	1/4	.2500	12.85	102.80
3/8	.375	19.27	154.16	3/16	.1875	9.63	77.04

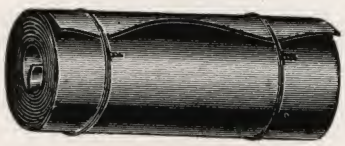
Soft Sheet Brass (Flat Sheets)

Brown & Sharpe Gauge

Lengths about 8 Feet

Thickness In. or Ga. No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Sheet	Thickness In. or Ga. No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Sheet
			SHEETS 6" WIDE				
1/8	.125	2.754	22.03	18	.0403	.8879	7.10
12	.0808	1.780	14.24	20	.0320	.7041	5.63
14	.0641	1.412	11.29	22	.0254	.5584	4.46
16	.0508	1.119	8.95				
			SHEETS 8" WIDE				
14	.0641	1.883	15.06	20	.0320	.9400	7.52
16	.0508	1.492	11.93	22	.0254	.7445	5.95
18	.0403	1.184	9.47				
			SHEETS 12" WIDE				
1/8	.125	5.508	44.06	18	.0403	1.776	14.20
12	.0808	3.560	28.48	20	.0320	1.410	11.28
14	.0641	2.825	22.60	22	.0254	1.115	8.92
16	.0508	2.238	17.90				

Soft Sheet Brass (In Rolls)



Brown & Sharpe Gauge

Gauge No.	Decimal Inch	Wght. Lin. Ft.	Gauge No.	Decimal Inch	Wght. Lin. Ft.	Gauge No.	Decimal Inch	Wght. Lin. Ft.
				ROLLS 8" WIDE				
20	.0320	.9430	22	.0253	.7460			
				ROLLS 10" WIDE				
20	.0320	1.179	26	.0159	.5860	32	.0080	.2920
22	.0253	.9320	28	.0126	.464	34	.0063	.2315
24	.0201	.740	30	.0100	.3679			
				ROLLS 12" WIDE				
20	.0320	1.408	26	.0159	.7024	32	.0080	.3503
22	.0253	1.117	28	.0126	.5570	34	.0063	.2778
24	.0201	.8857	30	.0100	.4417	36	.0050	.2203
				ROLLS 14" WIDE				
18	.0403	2.078	24	.0201	1.033	30	.0100	.5153
20	.0320	1.650	26	.0159	.8195	32	.0080	.4087
22	.0253	1.304	28	.0126	.6498	34	.0063	.3241
				ROLLS 16" WIDE				
18	.0403	2.376	24	.0201	1.183	30	.0100	.5889
20	.0320	1.886	26	.0159	.9380	32	.0080	.4670
22	.0253	1.492	28	.0126	.7420			
				ROLLS 18" WIDE				
20	.0320	2.122	26	.0159	1.054	32	.0080	.5254
22	.0253	1.678	28	.0126	.836			
24	.0201	1.332	30	.0100	.6625			
				ROLLS 20" WIDE				
20	.0320	2.358	24	.0201	1.480	28	.0126	.9280
22	.0253	1.864	26	.0159	1.172	30	.0100	.7358

Spring Sheet Brass

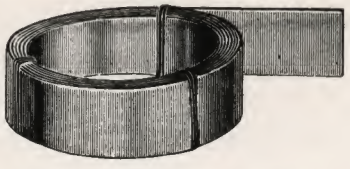
Brown & Sharpe Gauge

Lengths about 8 Feet

Gauge No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Sheet	Gauge No.	Decimal Inch	Wght. Lin. Ft.	Wght. Per 8 Ft. Sheet
			SHEETS 12" WIDE				
1/8	.125	5.508	44.06	24	.0201	.8857	7.08
3/32	.0937	4.131	33.04	26	.0159	.7024	5.62
12	.0808	3.560	28.48	28	.0126	.5570	4.46
14	.0641	2.825	22.60	30	.0100	.4417	3.53
16	.0508	2.233	17.90	32	.0080	.3503	2.80
18	.0403	1.776	14.20	34	.0063	.2778	2.22
20	.0320	1.408	11.26	36	.0050	.2203	1.76
22	.0254	1.117	8.94				

Ribbon Brass—Half Hard

Brown & Sharpe Gauge



Random Length Coils

Width Inches	Wght. Lin. Ft.
No. 26 B&S Gauge .01594 Inch	
1/4	.0146
5/16	.0183
1/2	.0292
No. 24 B&S Gauge .0201 Inch	
3/16	.0138
1/4	.0185
5/16	.0231
3/8	.0277
7/16	.0323
1/2	.0369
5/8	.0461
3/4	.0554
1	.0738
No. 22 B&S Gauge .02535 Inch	
3/16	.0174
1/4	.0233
5/16	.0291
3/8	.0349
7/16	.0407
1/2	.0465
5/8	.0582
3/4	.0698
7/8	.0814
1	.0930
1 1/8	.1047
1 1/4	.1163
1 1/2	.1396
1 3/4	.1629
2	.1861
2 1/4	.2094
2 1/2	.2327

Width Inches	Wght. Lin. Ft.
No. 20 B&S Gauge .03196 Inch	
1/4	.0293
5/16	.0367
3/8	.0440
1/2	.0586
5/8	.0733
3/4	.0880
7/8	.1027
1	.1174
1 1/8	.1320
1 1/4	.1467
1 1/2	.1760
1 3/4	.2054
2	.2347
2 1/4	.2640
2 1/2	.2934
No. 18 B&S Gauge .0403 Inch	
1/4	.0370
5/16	.0462
3/8	.0555
1/2	.0740
5/8	.0925
3/4	.1110
7/8	.1295
1	.1480
1 1/8	.1665
1 1/4	.1850
1 1/2	.2220
1 3/4	.2590
2	.2960
2 1/4	.3330
2 1/2	.3700

Width Inches	Wght. Lin. Ft.	Width Inches	Wght. Lin. Ft.
No. 16 B&S Gauge .05082 Inch			
1/2	.0933	1 1/4	.2332
5/8	.1166	1 1/2	.2799
3/4	.1399	1 3/4	.3265
7/8	.1632	2	.3732
1	.1866	2 1/4	.4198
1 1/8	.2099	2 1/2	.4665

Perforated Sheet Brass

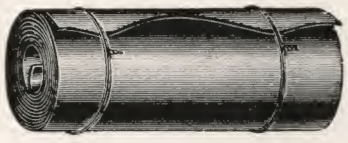
SHEETS 12" x 96"

No.	Hole Diam.	Holes Per Square In.	Pattern	B&S Gauge
00	.020	625	Staggered	26
0	.023	576	Straight	26
1	.027	400	do	26
2	.033	324	do	26
3	.039	225	do	26
4	.045	225	do	24
5	.045	169	Staggered	24
6	.050	144	Straight	24
7	.057	144	do	24
8A	.062	100	do	22
9	.068	81	do	22
10A	.085	64	do	22
11	.100	49	do	22
12	.100	36	do	22
14A	.125	25	do	20
15	.150	25	Staggered	18
16	.187	16	do	16

We can supply Perforated Sheet Metal in Copper, ALLEGHENY METAL, Stainless Steel, or other commercial metal to specification upon order.

For Wire Cloth and Screen Cloth, see Pages 48 and 49.

Sheet Brass in Rolls

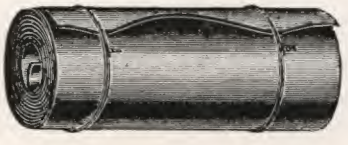


Extra Thin or Plater's Metal

Random Length Rolls

Thickness Dec. Inch	Width Inch	Wght Per Lin. Ft.	Lin. Ft. Per Lb.
.001	6	.02214	45
.002	6	.04428	22
.003	6	.06642	15
.004	6	.08856	11
.005	12	.2214	4.5

Shim Brass



Hard Temper

Random Length Rolls

ROLLS 6" WIDE

Thickness	Ft. Per Pound
.001	45
.002	22
.003	15
.004	11
.005	9
.006	7
.008	5.5
.010	4.5
.015	3
.020	2.25

ROLLS 12" WIDE

.003	7
.005	4.5
.006	3.5
.008	2.75
.010	2.25
.012	1.75
.015	1.5
020	1.125

For Laminum Shims, see Page 24.

Silicon Sheet Bronze

Hot Rolled—Annealed

A high copper-silicon alloy with tensile strength comparable to steel

Sheet Size	Thickness B&S Gauge	Thickness Nearest USS Ga.	Decimal	Weight Lin. Ft.	Weight Sheet
30x 96	20	22	.03196	3.538	28.3
30x 96	18	20F	.0403	4.455	35.7
30x 96	16	18	.05082	5.610	44.9
30x 96	14	16F	.06408	7.085	56.7
36x 96	20	22	.03196	4.245	34.0
36x 96	18	20F	.0403	5.346	42.8
36x 96	16	18	.05082	6.735	53.9
36x 96	14	16F	.06408	8.502	68.0
36x 96	3/16	7	.1875	24.867	198.8
48x 96	12	14F	.08081	14.288	114.3
48x 96	10	12L	.1019	18.003	144.0
48x 96	1/8	11	.125	22.104	176.9
60x 96	1/8	11	.125	27.630	221.0
60x120	12	14F	.08081	17.860	178.6
60x120	1/8	11	.125	27.630	276.3

F—Full. L—Light.

Lead Coated Sheet Copper

Standard Weight Lead Coated, 12 to 15 pounds of lead per 100 square feet both sides. (6 to 7½ lbs. each side)

Invoiced at actual weight of copper before lead coating.

COLD ROLLED

16 Ounce

.0216 Dec. In. #23 B&S 24 Stubs

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
30x 96	2.50	20.0
36x 96	3.00	24.0
36x120	3.00	30.0

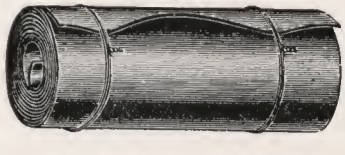
HOT ROLLED

16 Ounce

.0216 Dec. In. #23 B&S 24 Stubs

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
30x 96	2.50	20.0
36x 96	3.00	24.0
30x120	2.50	25.0

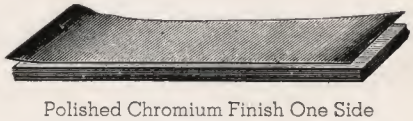
Shim Steel



ROLLS—6 INCHES WIDE

Thickness	Weight Per Lin. Foot	Lin. Feet Per Pound
.002	.0408	24.510
.003	.0612	16.340
.004	.0816	12.255
.005	.1020	9.804
.006	.1224	8.170
.007	.1434	6.972
.008	.1594	6.177
.009	.1913	5.446
.010	.2040	4.902
.015	.3060	3.268

Chromium Plated Sheet Copper



Polished Chromium Finish One Side

COLD ROLLED

16 Ounce

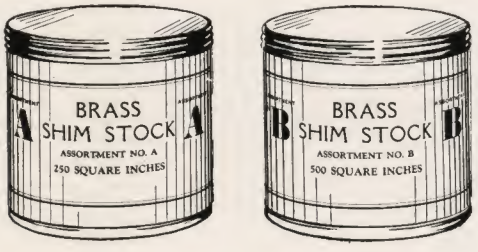
.0216 Dec. In. #23 B&S 24 Stubs

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
24x96	2.00	16.0
30x96	2.50	20.0
36x96	3.00	24.0

Brass Laminum Strips

Brass Shim Stock Assortments

Practical assortments of shim brass in screw top cans. Particularly selected to meet the requirements of Service Stations, Garages, Repair Shops and Accessory Stores which continually use very thin brass in various thicknesses.



Assortment A—250 Sq. In. Each $1.50
1 Strip each 2½" x 25" .002", .005", 010", .015" Thickness

Assortment B—500 Sq. In. Each $2.25
2 Strips each 2½" x 25" .002", .005", .010", .015" Thickness

Shimming Brass

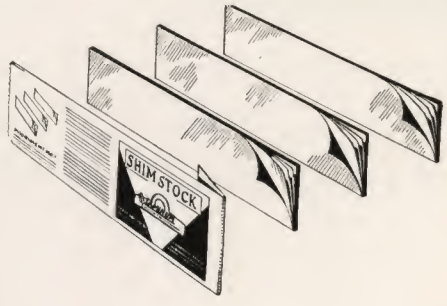
Individual Strips

Finest quality shim brass for service work. Put up in Rolls of 600 square inches. Wrapped in Special Paper. Each roll plainly marked with size and thickness.

SHIMMING BRASS

Thickness	Width	Length	Price Per Roll
.001"	6"	100"	$2.50
.002"	6"	100"	2.25
.003"	6"	100"	2.25
.005"	6"	100"	2.25
.010"	6"	100"	2.50
.002"	2½"	25"	.25
.005"	2½"	25"	.25

Strip Assortments



No. 1 Assortment.....Each $3.25
1 Strip each size—2" x 9" 1/8", 1/16", 1/32"—.002" Laminum

No. 2 Assortment.....Each 3.00
1 Strip each size—2" x 9" 1/8", 1/16", 1/32"—.003" Laminum

No. 3 Assortment.....Each 2.25
3 Strips 2" x 9" x 1/32"—.002" Laminum

No. 4 Assortment.....Each 2.00
3 Strips 2" x 9" x 1/32"—.003" Laminum

No. 5 Assortment.....Each 1.35
3 Strips 2" x 9" x 1/64"—.002" Laminum

No. 6 Assortment.....Each 1.25
3 Strips 2" x 9" x 1/64"—.003" Laminum

No. 7 Assortment (Not Laminated).....Each 1.25
1 Strip each 2½" x 25" .002", .005", .007", .010" thickness

No. 8 Assortment (Not Laminated).....Each .60
1 Strip each size 4" x 6¼" .002", .003", .005", .007", .010" thickness.

Laminum 6-Inch by 36-Inch Sheets

All .002" Laminations		All .003" Laminations	
Thickness	**Price Each**	**Thickness**	**Price Each**
.006"	$ 1.55	1/64"	$ 3.00
1/64"	3.40	1/32"	5.95
1/32"	6.75	1/16"	11.50
1/16"	13.00	1/8 "	23.00
1/8 "	25.50		
Half .002" Laminations—Half Solid		Half .003" Laminations—Half Solid	
1/16"	9.90	1/16"	8.85
1/8 "	18.80	1/8 "	16.75

1/32" Thickness and less—cut with hand shears.

Thicker than 1/32"—cut with hack saw.

Laminum 2-Inch by 9-Inch Strips

Thickness	Price Each
All .002" Laminations	
1/32"	$ .80
1/64"	.70
All .003" Laminations	
1/32"	.50
1/64"	.45
Half .002" Laminations—Half Solid	
1/8 "	2.00
1/16"	1.10
Half .003" Laminations—Half Solid	
1/8 "	1.80
1/16"	.95

Cold Rolled Sheet Copper (Cornice)

Rolled to weight per Square Foot in Ounces

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
10 Ounce		
.0134 Dec. In.	#27 B&S	#29 Stubs
30x 96	1.562	12.5
12 Ounce		
.0162 Dec. In.	#26 B&S	#27 Stubs
30x 96	1.875	15.
14 Ounce		
.0189 Dec. In.	#25 B&S	#26 Stubs
24x 96	1.75	14.0
30x 96	2.187	17.5
30x120	2.187	21.87
36x 96	2.625	21.
36x120	2.625	26.25
16 Ounce		
.0216 Dec. In.	#23 B&S	#24 Stubs
24x 96	2.00	16.
24x120	2.00	20.
30x 96	2.50	20.
30x120	2.50	25.
36x 96	3.00	24.
36x120	3.00	30.
48x 96	4.00	32.
18 Ounce		
.0243 Dec. In.	#22 B&S	#23 Stubs
24x 96	2.25	18.
24x120	2.25	22.5
30x 96	2.812	22.5
30x120	2.812	28.13
36x 96	3.375	27.
36x120	3.375	33.75
20 Ounce		
.027 Dec. In.	#21 B&S	#22 Stubs
24x 96	2.50	20.
30x 96	3.125	25.
30x120	3.125	31.25
36x 96	3.75	30.
36x120	3.75	37.5
24 Ounce (1/32 Inch)		
.0324 Dec. In.	#20 B&S	#21 Stubs
24x 96	3.00	24.
30x 96	3.75	30.
30x120	3.75	37.5
36x 96	4.50	36.
36x120	4.50	45.
48x 96	6.00	48.
28 Ounce		
.0378 Dec. In.	#19 B&S	#20 Stubs
30x120	4.375	43.75
36x120	5.25	52.50
32 Ounce		
.0432 Dec. In.	#17 B&S	#19 Stubs
24x 96	4.00	32.
30x 96	5.00	40.
30x120	5.00	50.
36x 96	6.00	48.
36x120	6.00	60.
48x 96	8.00	64.
48x120	8.00	80.
60x 96	10.00	80.
60x120	10.00	100.

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
36 Ounce		
.0486 Dec. In.	#16 B&S	#18 Stubs
30x 96	5.625	45.
36x 96	6.75	54.
48x 96	9.00	72.
40 Ounce (2½ lb.)		
.054 Dec. In.	#15 B&S	#17 Stubs
30x 96	6.25	50.
36x 96	7.50	60.
36x120	7.50	75.
48x 96	10.00	80.
48x120	10.00	100.
60x 96	12.50	100.
48 Ounce (3 lb.)		
.0648 Dec. In.	#14 B&S	#16 Stubs
24x 96	6.0	48.
30x 96	7.5	60.
36x 96	9.0	72.
36x120	9.0	90.
48x 96	12.0	96.
48x120	12.0	120.
60x 96	15.0	120.
60x120	15.0	150.
4 Pound (64 oz.)		
.0864 Dec. In.	#11 B&S	#14 Stubs
48x 96	16.0	128.
48x120	16.0	160.
60x 96	20.0	160.
60x120	20.0	200.
4½ Pound (72 oz.)		
.0972 Dec. In.	#10 B&S	#13 Stubs
48x120	18.0	180.
60x 96	22.5	180.
60x120	22.5	225.
5 Pound (80 oz.)		
.1080 Dec. In.	#10 B&S	#12 Stubs
48x 96	20.	160.
48x120	20.	200.
60x120	25.	250.
6 Pound (⅛")		
.1296 Dec. In.	#8 B&S	#10 Stubs
48x 96	24.	192.
48x120	24.	240.
60x 96	30.	240.
60x120	30.	300.
9 Pound		
.1944 Dec. In.	#4 B&S	#6 Stubs
60x 96	45.	360.
60x120	45.	450.
12 Pound (¼")		
.2592 Dec. In.	#2 B&S	#3 Stubs
24x 96	24.0	192.
⅜" (17.38 lbs. Sq. Ft.)		
24x 96	34.75	278.
36x 96	52.13	417.
½" (23.26 lbs. Sq. Ft.)		
24x 96	46.52	372.

For Lead Coated or Chromium Plated Copper, see Page 23.

COLD ROLLED SHEET COPPER
Tinned One Side

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
16 Ounce		
.0216 Dec. In.	#23 B&S	#24 Stubs
30x 96	2.50	20.
30x120	2.50	25.
36x 96	3.00	24.
36x120	3.00	30.
18 Ounce		
.0243 Dec. In.	#22 B&S	#23 Stubs
30x 96	2.812	22.5
36x 96	3.375	27.
20 Ounce		
.027 Dec. In.	#21 B&S	#22 Stubs
30x 96	3.125	25.
36x 96	3.75	30.
24 Ounce		
.0324 Dec. In.	#20 B&S	#21 Stubs
30x 96	3.75	30.
36x 96	4.50	36.
32 Ounce		
.0432 Dec. In.	#17 B&S	#19 Stubs
36x 96	6.00	48.

Tinned Two Sides

16 Ounce		
.0216 Dec. In.	#23 B&S	#24 Stubs
30x 96	2.50	20.
36x 96	3.00	24.
18 Ounce		
.0243 Dec. In.	#22 B&S	#23 Stubs
30x 96	2.812	22.5
36x 96	3.375	27.
20 Ounce		
.027 Dec. In.	#21 B&S	#22 Stubs
30x 96	3.125	25.
36x 96	3.75	30.
24 Ounce		
.0324 Dec. In.	#20 B&S	#21 Stubs
36x 96	4.50	36.
32 Ounce		
.0432 Dec. In.	#17 B&S	#19 Stubs
36x 96	6.00	48.

Polished One Side

14 Ounce		
.0189 Dec. In.	#25 B&S	#26 Stubs
30x 96	2.187	17.5
16 Ounce		
.0216 Dec. In.	#23 B&S	#24 Stubs
30x 96	2.5	20.
36x 96	3.0	24.

Hot Rolled (Soft) Sheet Copper

Rolled to weight per Square Foot in Ounces

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
12 Ounce		
.0162 Dec. In.	#26 B&S	#27 Stubs
30x 96	1.875	15.
14 Ounce		
.0189 Dec. In.	#25 B&S	#26 Stubs
24x 96	1.75	14.
30x 96	2.187	17.5
30x120	2.187	21.87
36x 96	2.625	21.
36x120	2.625	26.25
16 Ounce		
.0216 Dec. In.	#23 B&S	#24 Stubs
24x 96	2.00	16.
24x120	2.00	20.
30x 96	2.50	20.
30x120	2.50	25.
36x 96	3.00	24.
36x120	3.00	30.
48x 96	4.00	32.
18 Ounce		
.0243 Dec. In.	#22 B&S	#23 Stubs
24x 96	2.25	18.
30x 96	2.812	22.5
30x120	2.812	28.12
36x 96	3.375	27.
36x120	3.375	33.75
20 Ounce		
.027 Dec. In.	#21 B&S	#22 Stubs
24x 96	2.50	20.
30x 96	3.125	25.
30x120	3.125	31.25
36x 96	3.75	30.
36x120	3.75	37.5
24 Ounce		
.0324 Dec. In.	#20 B&S	#21 Stubs
24x 96	3.00	24.
30x 96	3.75	30.
30x120	3.75	37.5
36x 96	4.50	36.
36x120	4.50	45.
48x 96	6.00	48.
28 Ounce		
.0378 Dec. In.	#19 B&S	#20 Stubs
30x120	4.375	43.75
36x120	5.25	52.50
32 Ounce (2 lb.)		
.0432 Dec. In.	#17 B&S	#19 Stubs
24x 96	4.00	32.
30x 96	5.00	40.
30x120	5.00	50.
36x 96	6.00	48.
36x120	6.00	60.
48x 96	8.00	64.
48x120	8.00	80.
60x 96	10.00	80.
60x120	10.00	100.

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
36 Ounce		
.0486 Dec. In.	#16 B&S	#18 Stubs
30x 96	5.625	45.
36x 96	6.75	54.
2½ Pound (40 oz.)		
.054 Dec. In.	#15 B&S	#17 Stubs
30x 96	6.25	50.
36x 96	7.50	60.
48x 96	10.00	80.
48x120	10.00	100.
60x 96	12.50	100.
3 Pound (48 oz.)		
.0648 Dec. In.	#14 B&S	#16 Stubs
30x 96	7.5	60.
36x 96	9.0	72.
36x120	9.0	90.
48x 96	12.0	96.
48x120	12.0	120.
60x 96	15.0	120.
60x120	15.0	150.
3½ Pound (56 oz.)		
.0756 Dec. In.	#13 B&S	#15 Stubs
48x 96	14.0	112.
60x120	17.5	175.
4 Pound (64 oz.)		
.0864 Dec. In.	#11 B&S	#14 Stubs
48x 96	16.	128.
48x120	16.	160.
60x 96	20.	160.
60x120	20.	200.
4½ Pound (72 oz.)		
.0972 Dec. In.	#10 B&S	#13 Stubs
48x 96	18.	144.
60x 96	22.5	180.
60x120	22.5	225.
5 Pound (80 oz.)		
.1080 Dec. In.	#10 B&S	#12 Stubs
48x 96	20.	160.
48x120	20.	200.
60x 96	25.	200.
60x120	25.	250.
6 Pound (⅛")		
.1296 Dec. In.	#8 B&S	#10 Stubs
48x 96	24.	192.
48x120	24.	240.
48x144	24.	288.
60x 96	30.	240.
60x120	30.	300.
7 Pound		
.1512 Dec. In.	#7 B&S	#9 Stubs
60x120	35.	350.
8 Pound		
.1728 Dec. In.	#5 B&S	#7 Stubs
48x 96	32.	256.
60x 96	40.	320.
60x120	40.	400.

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
9 Pound		
.1944 Dec. In.	#4 B&S	#6 Stubs
60x 96	45.	360.
60x120	45.	450.
72x120	54.	540.
72x144	54.	648.
10 Pound		
.216 Dec. In.	#4 B&S	#5 Stubs
48x 96	40.	320.
60x 96	50.	400.
60x144	50.	600.
11 Pound		
.2376 Dec. In.	#3 B&S	#4 Stubs
60x120	55.0	550.
12 Pound (¼")		
.2592 Dec. In.	#2 B&S	#3 Stubs
48x 96	48.	384.
60x 96	60.	480.
60x120	60.	600.
72x144	72.	864.
⅜" (17.38 lbs. Sq. Ft.)		
48x 96	69.5	556.
½" (23.26 lbs. Sq. Ft.)		
36x 96	69.5	556.

Cold Rolled Strip Copper

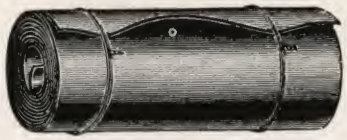
PARALLEL EDGE

For Leader, Gutter, Flashing, and General Roofing Purposes.

Rolled to weight in oz. per sq. ft.

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
16 Ounce		
.0216 Dec. In.	#23 B&S	#24 Stubs
9 15/16x120	.828	8.28
10 x120	.833	8.33
12 x120	1.00	10.00
13 x120	1.083	10.83
13 ⅛ x120	1.093	10.93
14 x120	1.167	11.67
15 x120	1.25	12.50
16 ¼ x120	1.354	13.54
16 ½ x120	1.375	13.75
19 ½ x120	1.625	16.25

Cold Rolled Annealed (Soft) Copper in Rolls



About 50 Pounds Per Roll

Width Inches	Wght Lin. Ft.	Approx. Lin. Ft. 50 Lb. Roll
10 Ounce		
.0135 Dec. In. #27 B&S #29 Stubs		
12	.625	80
12 Ounce		
.0162 Dec. In. #26 B&S #27 Stubs		
12	.750	67
14	.875	57
14 Ounce		
.019 Dec. In. #25 B&S #26 Stubs		
12	.875	57
14	1.02	49
16	1.16	43
18	1.31	38
20	1.45	34
16 Ounce		
.0216 Dec. In. #23 B&S #24 Stubs		
6	.50	100
8	.666	75
10	.833	60
12	1.00	50
14	1.16	43
16	1.33	37
18	1.50	33
20	1.66	30
18 Ounce		
.0243 Dec. In. #22 B&S #23 Stubs		
12	1.125	44
14	1.312	38
16	1.50	33
18	1.687	30
20	1.875	27

Width Inches	Wght Lin. Ft.	Approx. Lin. Ft. 50 Lb. Roll
20 Ounce		
.027 Dec. In. #21 B&S #22 Stubs		
12	1.25	40
14	1.458	34
16	1.666	30
18	1.875	27
24 Ounce		
.0324 Dec. In. #20 B&S #21 Stubs		
12	1.50	33
14	1.75	28
16	2.00	25
18	2.25	22
20	2.50	20
28 Ounce		
.0378 Dec. In. #19 B&S #20 Stubs		
20	2.90	17
32 Ounce		
.0432 Dec. In. #17 B&S #19 Stubs		
12	2.00	25
14	2.333	21
16	2.666	18
18	3.000	16
20	3.333	15
36 Ounce		
.0486 Dec. In. #16 B&S #18 Stubs		
12	2.25	22
14	2.62	19
16	3.00	17
18	3.37	15

Extra Thin Roll Copper

Suitable for all shimming purposes.

B&S Gauge—Random Length Rolls

Thickness Dec. Inch	Wght Per Lin. Ft.	No. Feet Per Lb.
ROLLS 6" WIDE		
.001	.0231	43.2
.002	.0462	21.6
.003	.0693	14.4
.004	.0924	10.8
.005	.1150	8.6
.006	.1386	7.2
.008	.1848	5.4
.010	.2300	4.3
.012	.2772	3.6
.015	.3450	2.9
.020	.4600	2.2
ROLLS 12" WIDE		
.003	.1386	7.2
.005	.2300	4.3
.006	.2778	3.6
.008	.3704	2.7
.010	.4630	2.2
.012	.5544	1.8
.015	.6900	1.5
.020	.9200	1.1

HARD COPPER IN ROLLS

Thickness Dec. Inch	Wght Per Lin. Ft.	No. of Ft. Per 1 Lb.
ROLLS 6" WIDE		
.005	.1155	8.6
ROLLS 12" WIDE		
.005	.231	4.3
.006	.2778	3.6
.010	.4630	2.2

Spring Brush Copper

Brown & Sharpe Gauge

Width Inch	B&S Ga. No.	Decimal Inch	Wght Lbs. 100 Feet
½	30	.010	1.980
	36	.005	.969
⅝	30	.010	2.421
	36	.005	1.212
¾	30	.010	2.911
	36	.005	1.539
1	30	.010	3.880
	36	.005	1.942
1¼	30	.010	4.801
	36	.005	2.403
1½	30	.010	5.860
	36	.005	2.911
2	30	.010	7.760
	36	.005	3.884

Flat Nickel Silver Sheet

18 Per Cent

HALF HARD—B&S GAUGE

Lengths about 6 Feet

Thickness Gauge No.	Wght Per Lin. Ft.	Wght Per 6 Ft. Sheet
SHEETS 6" WIDE		
14	1.458	8.75
16	1.157	6.94
18	.922	5.53
20	.728	4.37
22	.577	3.46
24	.458	2.75
26	.363	2.18
28	.288	1.73
30	.228	1.37

18 Per Cent—Polished One Side

QUARTER HARD TEMPER

Thickness—Weight in Ozs. Per Sq. Ft.

Thickness Ounces	B&S Gauge	Dec. Inch	Approx. Wt. Per Sheet
SHEETS 24x96			
14	24	.0196	14.0
16	23	.0224	16.0
SHEETS 30x96			
14	24	.0196	17.5
16	23	.0224	20.0
18	22	.0252	22.5
20	21	.0281	25.0

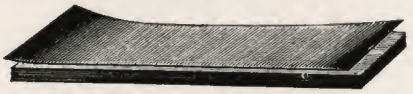
For Nickel Silver Wire refer to Page 44.
For Silver Solder refer to Page 152.

Phosphor Bronze Sheets—Spring Temper

Brown & Sharpe Gauge—Sheets about 6 Feet Long

Thickness Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per 6 Ft. Sheet	Thickness Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per 6 Ft. Sheet
			SHEETS 6" WIDE				
1/4	.25	5.800	34.80	20	.03196	.724	4.34
3/16	.1875	4.350	26.10	21	.02846	.653	3.91
1/8	.1250	2.900	17.40	22	.02535	.574	3.44
10	.1019	2.308	13.84	24	.02010	.455	2.73
12	.08081	1.830	10.98	26	.01594	.361	2.16
14	.06408	1.451	8.70	28	.01264	.286	1.71
16	.05082	1.151	6.90	30	.01003	.227	1.36
17	.04526	1.025	6.15	32	.00795	.180	1.08
18	.04030	.913	5.47	34	.00630	.145	.87
19	.03589	.812	4.87	36	.00500	.115	.69
			SHEETS 12" WIDE				
1/8	.1250	5.800	34.80	20	.03196	1.448	8.68
10	.1019	4.616	27.69	22	.02535	1.148	6.88
12	.08081	3.661	21.96	24	.02010	.910	5.46
14	.06408	2.903	17.41	26	.01594	.722	4.33
16	.05082	2.302	13.81	28	.01264	.572	3.43
18	.04030	1.826	10.95	30	.01003	.454	2.72

Commercial Bronze Sheets—Half Hard



Brown & Sharpe Gauge—Sheets about 8 Feet Long

Thickness Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per 8 Ft. Sheet	Thickness Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per 8 Ft. Sheet
			SHEETS 10" WIDE				
14	.06408	2.456	19.65	18	.04030	1.546	12.37
16	.05082	1.957	15.66				
			SHEETS 12" WIDE				
1/8	.125	5.96	47.68	22	.02535	1.116	8.93
14	.06408	2.94	23.52	24	.02010	.927	7.42
16	.05082	2.35	18.80	26	.01594	.733	5.86
18	.04030	1.86	14.88	28	.01264	.580	4.64
20	.03196	1.47	11.76				
			SHEETS 14" WIDE				
14	.06408	3.44	27.52	20	.03196	1.72	13.76
16	.05082	2.74	21.92	22	.02535	1.36	10.88
18	.04030	2.16	17.28	24	.02010	1.08	8.64
			SHEETS 16" WIDE				
14	.06408	3.93	31.44	18	.04030	2.48	19.84
16	.05082	3.13	25.04	20	.03196	1.96	15.68
			SHEETS 18" WIDE				
14	.06408	4.42	35.36	20	.03196	2.21	17.68
16	.05082	3.52	28.16	22	.02535	1.75	14.00
18	.04030	2.78	22.24				
			SHEETS 20" WIDE				
14	.06408	4.91	39.28	20	.03196	2.46	19.68
16	.05082	3.91	31.28	22	.02535	1.94	15.52
18	.04030	3.09	24.72	24	.02010	1.54	12.32
			SHEETS 24" WIDE				
1/8	.125	11.91	95.28	18	.04030	3.72	29.76
14	.06408	5.88	47.04	20	.03196	2.94	23.52
16	.05082	4.70	37.60	22	.02535	2.32	18.56

Stainless Steel Sheets

18 & 8 Chromium—Nickel

ALLEGHENY METAL

Stainless Type No. 302

No. 2 B Finish—Bright—Cold Rolled

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
26 USS GAUGE—.018		
24x 96	1.575	12.60
30x 96	1.968	15.75
36x 96	2.362	18.90
36x120	2.362	23.62
24 USS GAUGE—.025		
30x 96	2.625	21.00
36x 96	3.150	25.20
36x120	3.150	31.50
22 USS GAUGE—.03125		
30x 96	3.281	26.25
36x 96	3.937	31.50
36x120	3.937	39.37
20 USS GAUGE—.0375		
30x 96	3.937	31.50
36x 96	4.725	37.80
36x120	4.725	47.25
48x120	6.300	63.00
18 USS GAUGE—.050		
36x 96	6.300	50.40
36x120	6.300	63.00
48x120	8.400	84.00
16 USS GAUGE—.0625		
30x 96	6.562	52.50
36x 96	7.875	63.00
36x120	7.875	78.75
48x120	10.500	105.00
14 USS GAUGE—.0781		
36x 96	9.844	78.75
36x120	9.844	98.44
48x120	13.125	131.25
12 USS GAUGE—.1093		
36x 96	13.781	110.25
36x120	13.781	137.81
48x120	18.375	183.75
11 USS GAUGE—.1250		
36x 96	15.75	126.00
36x120	15.75	157.50
48x120	21.00	210.00

No. 4 Finish—Polished One Side

Sheet Size	Wght Per Lin. Ft.	Wght Per Sheet
26 USS GAUGE—.018		
24x 96	1.575	12.60
24x120	1.575	15.75
30x 96	1.968	15.75
30x120	1.968	19.68
36x 96	2.362	18.90
36x120	2.362	23.62
24 USS GAUGE—.025		
24x 96	2.100	16.80
24x120	2.100	21.00
30x 96	2.625	21.00
30x120	2.625	26.25
36x 96	3.150	25.20
36x120	3.150	31.50
22 USS GAUGE—.03125		
24x 96	2.625	21.00
30x 96	3.281	26.25
30x120	3.281	32.81
36x 96	3.937	31.50
36x120	3.937	39.37
20 USS GAUGE—.0375		
24x 96	3.150	25.20
30x 96	3.937	31.50
30x120	3.937	39.37
36x 96	4.725	37.80
36x120	4.725	47.25
48x120	6.300	63.00
18 USS GAUGE—.050		
30x120	5.250	52.50
36x 96	6.300	50.40
36x120	6.300	63.00
48x 96	8.400	67.20
48x120	8.400	84.00
16 USS GAUGE—.0625		
24x 96	5.25	42.00
30x 96	6.562	52.50
30x120	6.562	65.62
36x 96	7.875	63.00
36x120	7.875	78.75
48x 96	10.500	84.00
48x120	10.500	105.00
14 USS GAUGE—.0781		
30x120	8.203	82.03
36x 96	9.844	78.75
36x120	9.844	98.44
48x 96	13.125	105.00
48x120	13.125	131.25
12 USS GAUGE—.1093		
30x 96	11.484	91.87
36x 96	13.781	110.25
36x120	13.781	137.81
48x 96	18.375	147.00
48x120	18.375	183.75
11 USS GAUGE—.1250		
36x120	15.75	157.50
48x120	21.00	210.00

For Chemical and Physical Properties, see Pages 232, 233.
For other Satinless Steel material and accessories see index, Page 8.

Flat Plate Aluminum—Half Hard

Sheets #8 and Thicker designated as plate.

Temper designation 2S4 (2S½H)

Thickness In. or Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Per Sheet
	PLATES 12"x72"		
½	.500	7.04	42.24
7/16	.4375	6.16	36.96
⅜	.375	5.28	31.68
5/16	.3125	4.40	26.40
¼	.250	3.52	21.12
3/16	.1875	2.64	15.84
6	.1620	2.28	13.68
8	.1285	1.81	10.86
	PLATES 24"x36"		
1	1.00	28.18	84.54
¾	.750	21.12	63.36
⅝	.625	17.60	52.80

Thickness In. or Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Per Sheet
	PLATES 24"x72"		
½	.500	14.08	84.48
⅜	.375	10.56	63.36
5/16	.3125	8.80	52.80
¼	.250	7.04	42.24
3/16	.1875	5.28	31.68
6	.1620	4.56	27.36
8	.1285	3.62	21.72
	PLATES 36"x120"		
3/16	.1875	7.92	79.20
6	.1620	6.84	68.40
8	.1285	5.43	54.30

Flat Sheet Aluminum—Half Hard

Temper Designation 2S4 (2S½H)

Brown & Sharpe Gauge

Gauge No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per Sheet
	SHEETS 12"x72"		
10	.1019	1.44	8.64
12	.0808	1.14	6.84
14	.0641	.903	5.42
16	.0508	.716	4.30
18	.0403	.568	3.41
20	.0320	.450	2.70
22	.0253	.357	2.14
24	.0201	.283	1.70
26	.0159	.225	1.36
28	.0126	.178	1.07
30	.0100	.141	.85
32	.0080	.113	.68
	SHEETS 24"x72"		
10	.1019	2.88	17.3
11	.0907	2.56	15.4
12	.0808	2.28	13.7
14	.0641	1.80	10.8
16	.0508	1.43	8.6
18	.0403	1.13	6.78
20	.0320	.900	5.4
22	.0253	.714	4.3
24	.0201	.570	3.4
26	.0159	.450	2.7
28	.0126	.356	2.2
30	.0100	.282	1.7
32	.0080	.226	1.4
34	.0063	.176	1.1

Gauge No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per Sheet
	SHEETS 30"x96"		
14	.0641	2.26	18.1
16	.0508	1.79	14.3
18	.0403	1.42	11.4
20	.0320	1.13	9.04
22	.0253	.893	7.14
24	.0201	.708	5.7
26	.0159	.563	4.5
28	.0126	.445	3.6
30	.0100	.353	2.82
	SHEETS 36"x120"		
10	.1019	4.32	43.2
12	.0808	3.42	34.2
14	.0641	2.71	27.1
16	.0508	2.15	21.5
18	.0403	1.70	17.0
20	.0320	1.35	13.5
22	.0253	1.07	10.7
24	.0201	.849	8.5
26	.0159	.675	6.75
28	.0126	.534	5.3
30	.0100	.423	4.2
	SHEETS 48"x144"		
14	.0641	3.61	43.3
16	.0508	2.86	34.3
18	.0403	2.27	27.2
20	.0320	1.80	21.6
22	.0253	1.43	17.2
	SHEETS 60"x144"		
14	.0641	4.52	54.24
16	.0508	3.58	43.0
18	.0403	2.84	34.1
20	.0320	2.25	27.

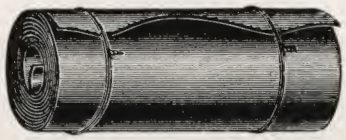
Flat Sheet Aluminum—Soft

Temper designation 2S0

Note: Weight is by Lineal Foot

Gauge No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per Sheet
	SHEETS 24"x72"		
14	.0641	1.80	10.8
16	.0508	1.42	8.5
18	.0403	1.13	6.78
20	.0320	.900	5.4
22	.0253	.714	4.3
24	.0201	.570	3.4
26	.0159	.450	2.7
28	.0126	.356	2.2
	SHEETS 30"x96"		
16	.0508	1.79	14.3
18	.0403	1.42	11.4
20	.0320	1.13	9.04
22	.0253	.893	7.14
24	.0201	.708	5.7
26	.0159	.563	4.5
	SHEETS 36"x96"		
16	.0508	2.15	17.2
	SHEETS 36"x120"		
6	.1620	6.84	68.40
8	.1285	5.43	54.30
10	.1019	4.32	43.20
12	.0808	3.42	34.2
14	.0641	2.71	27.10
16	.0508	2.15	21.50
18	.0403	1.70	17.00
20	.0320	1.35	13.50
22	.0253	1.07	10.70
24	.0201	.849	8.49
26	.0159	.675	6.75
	SHEETS 48"x120"		
14	.0641	3.61	36.10
16	.0508	2.86	28.60
18	.0403	2.27	22.70

Coiled Sheet Aluminum—Soft



Temper designation 2S0

Brown & Sharpe Gauge

For use in Spinning—Deep Drawing—Roofing

Gauge No.	Decimal Inch	Wght Per Lin. Ft.
	12" WIDE	
14	.0641	.903
16	.0508	.716
18	.0403	.568
20	.0320	.450
22	.0253	.357
24	.0201	.283
26	.0159	.225
28	.0126	.178
	14" WIDE	
18	.0403	.663
20	.0320	.525
	16" WIDE	
16	.0508	.955
18	.0403	.757
20	.0320	.600
	18" WIDE	
14	.0641	1.355
16	.0508	1.074
18	.0403	.852
20	.0320	.675
22	.0253	.536
24	.0201	.425
26	.0159	.338
28	.0126	.267
	20" WIDE	
16	.0508	1.194
18	.0403	.946
20	.0320	.750
22	.0253	.595
24	.0201	.472
	24" WIDE	
16	.0508	1.432
18	.0403	1.136
20	.0320	.900
22	.0253	.714

Flat Sheet Duralumin

Temper designation 17ST

Gauge No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per Sheet
	SHEETS 24"x120"		
30	.0100	.30	3.0
	SHEETS 36"x120"		
10	.1019	4.38	43.8
11	.0907	3.96	39.6
12	.0808	3.54	35.4
14	.0641	2.82	28.2
16	.0508	2.25	22.5
18	.0403	1.80	18.0
20	.0320	1.38	13.8
22	.0253	1.14	11.4
24	.0201	.90	9.0
26	.0159	.72	7.2
	SHEETS 36"x144"		
10	.1019	4.38	52.6
14	.0641	2.82	33.8
18	.0403	1.80	21.6
	SHEETS 48"x144"		
16	.0508	3.00	36.0
18	.0403	2.40	28.8
20	.0320	1.84	22.08
	SHEETS 60"x144"		
16	.0508	3.75	45.0

Flat Plate Duralumin—Heat Treated

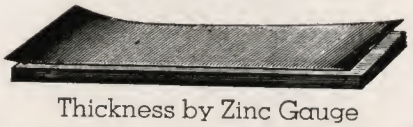
Temper designation 17ST

Conforms to U. S. Government specifications and is used extensively in Aeronautical work. Has a tensile strength comparable with that of Mild Steel.

Brown & Sharpe Gauge

Thickness In. or Ga. No.	Decimal Inch	Wght Per Lin. Ft.	Wght Lbs. Per Plate
	PLATES 12"x36"		
2	2.00	29.	87.0
	PLATES 12"x72"		
7/16	.4375	6.30	37.8
1/4	.250	3.62	21.7
3/16	.1875	2.76	16.56
	PLATES 24"x36"		
1 3/4	1.750	52.0	156.0
1 1/2	1.500	43.5	130.5
1 1/4	1.250	36.3	108.9
1	1.000	29.0	87.0
7/8	.875	26.0	78.0
3/4	.750	21.5	64.5
5/8	.625	18.1	54.3
1/2	.500	14.68	88.1
7/16	.4375	12.60	75.6
3/8	.275	10.82	64.9
5/16	.3125	9.00	54.0
1/4	.250	7.24	43.4
3/16	.1875	5.52	33.1
	PLATES 36"x120"		
1/4	.250	10.86	108.6
6	.1620	7.08	70.8
8	.1285	5.61	56.1
	PLATES 36"x144"		
1/4	.250	10.86	130.3
3/16	.1875	8.28	99.4
8	.1285	5.61	67.3
	PLATES 48"x144"		
8	.1285	7.48	89.8

Sheet Zinc



Thickness by Zinc Gauge

Plain Finish Sheet Zinc

Thickness Zinc. Ga. No.	Decimal Inch	B&S Gauge	Stubs Gauge	Wght Per Sheet
	SHEETS 36"x84"			
4	.008	32	33	6.30
5	.010	30	31	8.07
6	.012	28	30	9.45
7	.014	27	28	10.92
8	.016	26	27	12.60
9	.018	25	26	14.07
10	.020	24	25	15.75
11	.024	22	23	18.90
12	.028	21	22	22.05
	SHEETS 48"x96"			
7	.014	27	28	16.64
8	.016	26	27	19.20
9	.018	25	26	21.44
10	.020	24	25	24.00
11	.024	22	23	28.80
12	.028	21	22	33.60
14	.036	19	20	42.20
16	.045	17	18	53.76
24	.125	8	11	150.00
00	.250	2	3	300.00
	SHEETS 48"x108"			
8	.016	26	27	21.60
9	.018	25	26	24.12
10	.020	24	25	27.00
11	.024	22	23	32.40
12	.028	21	22	36.80

Chrome Plated Steel

POLISHED FINISH—ONE SIDE

U.S.S. Gauge	Decimal Inch	Sheet Size	Wght. Per Sheet
24	.025	20x96	14.0
24	.025	30x96	22.0

SHEET LEAD—See Page 138.

Chromaloid Sheet Zinc

Thickness Zinc. Ga. No.	Decimal Inch	B&S Gauge	Stubs Gauge	Sheet Size	Wght Per Sheet
	POLISHED CHROME FINISH ONE SIDE				
9	.018	25	26	30x96	13.5
9	.018	25	26	36x72	12
9	.018	25	26	36x96	16
11	.024	22	23	30x96	18
11	.024	22	23	36x96	21.5
13	.032	20	21	36x96	28.7
5	.010	12" Wide Coils.			
	SATIN FINISH—ONE SIDE				
9	.018	25	26	36x96	16

Nickeloid Sheet Zinc

POLISHED NICKEL FINISH ONE SIDE

9	.018	25	26	30x96	13.5
9	.018	25	26	36x96	16
11	.024	22	23	30x96	18
11	.024	22	23	36x96	21.5

Rolled Zinc Plates

FOR BOILER AND SHIP REQUIREMENTS

Thickness Inches	Plate Size	Wt. Per Plate	Thickness Inches	Plate Size	Wt. Per Plate
1/2	6x12	9	3/4	6x12	14
1/2	24x36	112	3/4	24x36	170
1/2	24x48	150	3/4	24x48	225
5/8	24x48	190	1	6x12	18
			1	24x36	224

Zinc Bars

Carried in Bars weighing about 3 pounds. Poured thin enough to be easily broken.

Round Seamless Brass Tubes—Hard Drawn

Outside Diameter

Stubs Gauge

Stocked in 12 Foot Lengths

3 FOOT LENGTHS—SMALL SIZES

No. 26 STUBS GAUGE—.018 WALL

Size O. D.	I. D.	Wght. Lin. Ft.	Wt. Per 3 Ft. Lgth
1/16	.0265	.0094	.028
3/32	.05775	.016	.048
1/8	.089	.022	.066
5/32	.12025	.029	.087
3/16	.1515	.035	.105
7/32	.18275	.042	.126
1/4	.214	.048	.144
9/32	.24525	.055	.165
5/16	.2765	.061	.183
11/32	.30775	.068	.204
3/8	.339	.074	.222
13/32	.3702	.081	.243

12 FOOT LENGTHS—SMALL SIZES

Size O. D.	Stubs Gauge	I. D.	Wght. Lin. Ft.	Wt. Per 12 Ft. Lgth
1/8	#20	.055	.03645	.437
1/8	22	.069	.03142	.377
1/8	24	.081	.02622	.314
5/32	24	.11225	.03417	.410
3/16	18	.0895	.07852	.942
3/16	20	.1175	.06175	.741
3/16	22	.1315	.05167	.620
3/16	24	.1435	.04213	.505
3/16	26	.1515	.03530	.423
7/32	20	.14875	.07441	.892
7/32	22	.16275	.06179	.741
1/4	#16	.120	.139	1.668
1/4	18	.152	.114	1.368
1/4	20	.180	.08706	1.044
1/4	22	.194	.07192	.863
1/4	24	.206	.05803	.696
5/16	16	.1825	.186	2.232
5/16	18	.2145	.1494	1.792
5/16	20	.2425	.1124	1.348
5/16	22	.2565	.09217	1.106
5/16	24	.2685	.07394	.887
7/16	24	.3935	.106	1.272
5/8	24	.581	.153	1.836

12 FOOT LENGTHS—LARGE SIZES

No. 22 STUBS GAUGE—.028 WALL

Size O. D.	I. D.	Wght. Lin. Ft.	Wt. Per 12' Lgth.
3/8	.319	.112	1.344
7/16	.3815	.133	1.596
1/2	.444	.153	1.836
9/16	.5065	.172	
5/8	.569	.193	2.316
11/16	.6315	.214	2.568
3/4	.694	.234	2.808
13/16	.7565	.254	3.048
7/8	.819	.274	3.288
15/16	.8815	.295	3.540
1	.944	.315	3.780
1 1/16	1.0065	.334	4.008
1 1/8	1.069	.355	4.260
1 3/16	1.1315	.375	4.500
1 1/4	1.194	.396	4.752
1 5/16	1.2565	.415	4.980
1 3/8	1.319	.436	5.232
1 7/16	1.3815	.456	5.472
1 1/2	1.444	.477	5.724
1 9/16	1.5065	.497	5.964
1 5/8	1.569	.517	6.204
1 3/4	1.694	.558	6.696
1 7/8	1.819	.598	7.176
2	1.944	.639	7.668

No. 20 STUBS GAUGE—.035 WALL

Size O. D.	I. D.	Wght. Lin. Ft.	Wt. Per 12' Lgth.
3/8	.305	.138	1.656
7/16	.3675	.163	1.956
1/2	.430	.188	2.256
9/16	.4925	.214	2.568
5/8	.555	.239	2.868
3/4	.680	.290	3.480
7/8	.805	.340	4.080
1	.930	.391	4.692
1 1/8	1.055	.441	5.292
1 1/4	1.180	.492	5.904
1 3/8	1.305	.543	6.516
1 1/2	1.430	.593	7.116
1 3/4	1.68	.694	8.328
2	1.93	.796	9.552
2 1/4	2.18	.897	10.764
2 1/2	2.43	.998	11.976
3	2.93	1.201	14.412
4	3.93	1.606	19.27

No. 18 STUBS GAUGE—.049 WALL

Size O. D.	I. D.	Wght. Lin. Ft.	Wt. Per 12' Lgth.
3/8	.277	.185	2.220
7/16	.3395	.220	2.640
1/2	.402	.256	3.072
5/8	.527	.327	3.924
3/4	.652	.397	4.764
7/8	.777	.468	5.616
1	.902	.539	6.468
1 1/8	1.027	.610	7.320
1 1/4	1.152	.681	8.172
1 3/8	1.277	.752	9.024
1 1/2	1.402	.823	9.876
1 5/8	1.527	.894	10.728
1 3/4	1.652	.964	11.57
2	1.902	1.106	13.27
2 1/4	2.152	1.248	14.98
2 1/2	2.402	1.390	16.68
3	2.902	1.673	20.07

(Continued on following page.)

For Consecutive Inside Diameters, see Page 35.
For Brass Railing Fittings see Pages 131, 132.

Round Seamless Brass Tubes—Hard Drawn

(Continued from preceding page)

Outside Diameters

Stubs Gauge

Stocked in 12 Foot Lengths

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
No. 20 STUBS GAUGE—.035 WALL			
3/8	.245	.233	2.796
7/16	.3075	.280	3.360
1/2	.370	.327	3.924
9/16	.4325	.374	4.488
5/8	.495	.421	5.052
11/16	.5575	.468	5.616
3/4	.620	.515	6.180
13/16	.6825	.562	6.744
7/8	.745	.609	7.308
15/16	.8075	.656	7.872
1	.870	.703	8.436
1 1/16	.9325	.748	8.976
1 1/8	.995	.792	9.504
No. 18 STUBS GAUGE—.049 WALL			
3/8	.209	.280	3.360
1/2	.334	.400	4.800
5/8	.459	.521	6.252
3/4	.584	.641	7.692
7/8	.709	.761	9.132
1	.834	.881	10.57
No. 16 STUBS GAUGE—.065 WALL			
1/2	.260	.528	6.336
5/8	.385	.700	8.40
3/4	.510	.88	10.56
7/8	.635	1.05	12.60
15/16	.6975	1.135	13.62
1	.760	1.22	14.64
1 1/8	.885	1.395	16.74
1 3/16	.9475	1.482	17.78
1 1/4	1.01	1.57	18.84
1 5/16	1.0725	1.655	19.86
1 3/8	1.135	1.742	20.90
1 1/2	1.26	1.916	22.99
1 5/8	1.385	2.090	25.08
1 3/4	1.51	2.263	27.16
No. 16 STUBS GAUGE—.065 WALL			
1 3/16	1.0575	.842	10.10
1 1/4	1.12	.891	10.69
1 5/16	1.1825	.938	11.25
1 3/8	1.245	.985	11.82
1 7/16	1.3075	1.032	12.36
1 1/2	1.37	1.08	12.96
1 5/8	1.495	1.17	14.04
1 3/4	1.62	1.27	15.24
1 7/8	1.745	1.36	16.32
2	1.87	1.45	17.40
2 1/8	1.995	1.55	18.60
2 1/4	2.12	1.64	19.68
2 1/2	2.37	1.83	21.96
No. 14 STUBS GAUGE—.083 WALL			
1 1/8	.959	1.00	12.00
1 1/4	1.084	1.121	13.45
1 1/2	1.334	1.361	16.33
1 5/8	1.459	1.481	17.77
1 3/4	1.584	1.601	19.21
2	1.834	1.841	22.09
No. 11 STUBS GAUGE—.120 WALL			
1 7/8	1.635	2.437	29.24
2	1.76	2.610	31.32
2 1/8	1.885	2.784	33.40
2 1/4	2.01	2.957	35.48
2 3/8	2.135	3.131	37.57
2 1/2	2.26	3.304	39.65
2 5/8	2.385	3.478	41.72
2 3/4	2.51	3.651	43.81
2 7/8	2.635	3.825	45.90
3	2.76	3.999	47.99
3 1/4	3.01	4.346	52.15
3 1/2	3.26	4.693	56.31
3 3/4	3.51	5.040	60.48
4	3.76	5.387	64.64

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
2 5/8	2.495	1.93	23.16
2 3/4	2.62	2.02	24.24
2 7/8	2.745	2.11	25.32
3	2.87	2.21	26.52
3 1/8	2.995	2.30	27.60
3 1/4	3.12	2.39	28.68
3 1/2	3.37	2.58	30.96
3 5/8	3.495	2.68	32.16
3 3/4	3.62	2.77	33.24
4	3.87	2.96	35.52
4 1/8	3.995	3.05	36.60
4 1/2	4.37	3.33	39.96
5	4.87	3.71	44.52
2 1/4	2.084	2.081	24.97
2 1/2	2.334	2.321	27.85
3	2.834	2.801	33.61
3 1/2	3.334	3.281	39.37
4 1/4	4.01	5.734	68.80
4 1/2	4.26	6.081	72.97
4 3/4	4.51	6.428	77.14
5	4.76	6.775	81.30
5 1/4	5.01	7.12	85.44
5 1/2	5.26	7.47	89.64
5 3/4	5.51	7.82	93.84
6	5.76	8.16	97.92
6 1/4	6.01	8.51	102.12
6 1/2	6.26	8.86	106.32
6 3/4	6.51	9.21	110.52
7 1/4	7.01	9.89	118.68
8	7.76	10.94	131.28
8 1/4	8.01	11.29	135.48

For Brass Railing Fittings, see Page 131, 132.

Square Seamless Brass Tubes—Hard Drawn

Outside Diameters

12 Foot Lengths

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
No. 22 STUBS GAUGE—.028 WALL			
1/4	.194	.0912	1.094
5/16	.2565	.1170	1.404
3/8	.319	.1422	1.706
7/16	.3815	.1688	2.026
1/2	.444	.1942	2.330
5/8	.569	.2450	2.940
3/4	.694	.2970	3.564
7/8	.819	.3478	4.174
1	.944	.3998	4.798
1 1/8	1.069	.4526	5.43
1 1/4	1.194	.5025	6.031
1 1/2	1.444	.6055	7.266
1 3/4	1.694	.7083	8.499
2	1.944	.8111	9.732
2 1/2	2.444	1.0167	12.20
3	2.944	1.2223	14.67

Round Seamless Brass Tubing

Random Length Coils

Soft Annealed

Size O. D.	I. D.	Wt. Lbs. Lin. Ft.	Wght Per 50 Ft. Coil
No. 20 STUBS GAUGE—.035 WALL			
1/4	.180	.087	4.35

For Consecutive Inside Diameters, see Page 35.

Seamless Brass Tubes and Pipe

Consecutive INSIDE Diameters—Stock Sizes

The list below is prepared as an assistance in selecting size of tubing where the inside diameter is the important consideration. Designation—IPS refers to Iron Pipe Size dimension, XH IPS refers to Extra Heavy Iron Pipe Size dimension.

I. D.	O. D.	Gauge	Wall
.0265	1/16	26	.018
.055	1/8	20	.035
.05775	3/32	26	.018
.069	1/8	22	.028
.081	1/8	24	.022
.089	1/8	26	.018
.0895	3/16	18	.049
.11225	5/32	24	.022
.1175	3/16	20	.035
.120	1/4	16	.065
.12025	5/32	26	.018
.1315	3/16	22	.028
.1435	3/16	24	.022
.14875	7/32	20	.035
.1515	3/16	26	.018
.152	1/4	18	.049
.16275	7/32	22	.028
.180	1/4	20	.035
.1825	5/16	16	.065
.18275	7/32	26	.018
.194	1/4	22	.028
.205	.405	1/8 XH IPS	.100
.206	1/4	24	.022
.209	3/8	14	.083
.214	1/4	26	.018
.2145	5/16	18	.049
.2425	5/16	20	.035
.245	3/8	16	.065
.24525	9/32	26	.018
.2565	5/16	22	.028
.260	1/2	11	.120
.2685	5/16	24	.022
.2765	5/16	26	.018
.277	3/8	18	.049
.281	.405	1/8 IPS	.062
.294	.540	1/4 XH IPS	.123
.305	3/8	20	.035
.3075	7/16	16	.065
.30775	11/32	26	.018
.319	3/8	22	.028
.334	1/2	14	.083
.339	3/8	26	.018
.3395	7/16	18	.049
.3675	7/16	20	.035
.370	1/2	16	.065
.3702	13/32	26	.018
.375	.540	1/4 IPS	.0825
.3815	7/16	22	.028
.385	5/8	11	.120
.3935	7/16	24	.022
.402	1/2	18	.049
.421	.675	3/8 XH IPS	.127
.430	1/2	20	.035
.4325	9/16	16	.065
.444	1/2	22	.028
.459	5/8	14	.083
.4925	9/16	20	.035
.494	.675	3/8 IPS	.0905
.495	5/8	16	.065
.5065	9/16	22	.028
.510	3/4	11	.120
.527	5/8	18	.049
.542	.840	1/2 XH IPS	.149
.555	5/8	20	.035
.5575	11/16	16	.065
.569	5/8	22	.028
.581	5/8	24	.022
.584	3/4	14	.083
.620	3/4	16	.065
.625	.840	1/2 IPS	.1075
.6315	11/16	22	.028
.635	7/8	11	.120
.652	3/4	18	.049
.680	3/4	20	.035
.6825	13/16	16	.065
.694	3/4	22	.028
.6975	15/16	11	.120
.709	7/8	14	.083
.736	1.050	3/4 XH IPS	.157
.745	7/8	16	.065
.7565	13/16	22	.028
.760	1	11	.120
.777	7/8	18	.049
.805	7/8	20	.035
.8075	15/16	16	.065
.819	7/8	22	.028
.822	1.050	3/4 IPS	.114
.834	1	14	.083
.870	1	16	.065
.8815	15/16	22	.028
.885	1 1/8	11	.120
.902	1	18	.049
.930	1	20	.035
.9325	1 1/16	16	.065
.944	1	22	.028
.9475	1 3/16	11	.120
.951	1.315	1 XH IPS	.182
.959	1 1/8	14	.083
.995	1 1/8	16	.065
1.0065	1 1/16	22	.028
1.010	1 1/4	11	.120
1.027	1 1/8	18	.049
1.055	1 1/8	20	.035
1.0575	1 3/16	16	.065
1.062	1.315	1 IPS	.126
1.069	1 1/8	22	.028
1.0725	1 5/16	11	.120
1.084	1 1/4	14	.083
1.12	1 1/4	16	.065
1.1315	1 3/16	22	.028
1.135	1 3/8	11	.120
1.152	1 1/4	18	.049
1.1825	1 5/16	16	.065
1.180	1 1/4	20	.035
1.194	1 1/4	22	.028
1.245	1 3/8	16	.065
1.2565	1 5/16	22	.028
1.260	1 1/2	11	.120
1.272	1.660	1 1/4 XH IPS	.194
1.277	1 3/8	18	.049
1.305	1 3/8	20	.035
1.3075	1 7/16	16	.065
1.319	1 3/8	22	.028
1.334	1 1/2	14	.083
1.368	1.660	1 1/4 IPS	.146
1.370	1 1/2	16	.065
1.3815	1 7/16	22	.028
1.385	1 5/8	11	.120
1.402	1 1/2	18	.049
1.430	1 1/2	20	.035
1.444	1 1/2	22	.028
1.459	1 5/8	14	.083
1.494	1.900	1 1/2 XH IPS	.203
1.495	1 5/8	16	.065
1.5065	1 9/16	22	.028
1.510	1 3/4	11	.120
1.527	1 5/8	18	.049
1.569	1 5/8	22	.028
1.584	1 3/4	14	.083
1.600	1.900	1 1/2 IPS	.150
1.620	1 3/4	16	.065
1.635	1 7/8	11	.120
1.652	1 3/4	18	.049
1.680	1 3/4	20	.035
1.694	1 3/4	22	.028
1.745	1 7/8	16	.065
1.760	2	11	.120
1.819	1 7/8	22	.028
1.834	2	14	.083
1.870	2	16	.065
1.885	2 1/8	11	.120
1.902	2	18	.049
1.930	2	20	.035
1.933	2.375	2 XH IPS	.221
1.944	2	22	.028
1.995	2 1/8	16	.065
2.010	2 1/4	11	.120
2.062	2.375	2 IPS	.157
2.084	2 1/4	14	.083
2.120	2 1/4	16	.065
2.135	2 3/8	11	.120
2.152	2 1/4	18	.049
2.180	2 1/4	20	.035
2.260	2 1/2	11	.120
2.315	2.875	2 1/2 XH IPS	.280
2.334	2 1/2	14	.083
2.370	2 1/2	16	.065
2.385	2 5/8	11	.120
2.402	2 1/2	18	.049
2.430	2 1/2	20	.035
2.495	2 5/8	16	.065
2.500	2.875	2 1/2 IPS	.188
2.510	2 3/4	11	.120
2.620	2 3/4	16	.065
2.635	2 7/8	11	.120
2.745	2 7/8	16	.065
2.760	3	11	.120
2.834	3	14	.083
2.870	3	16	.065
2.892	3.500	3 XH IPS	.304
2.902	3	18	.049
2.930	3	20	.035
2.995	3 1/8	16	.065
3.010	3 1/4	11	.120
3.062	3.500	3 IPS	.219
3.120	3 1/4	16	.065
3.260	3 1/2	11	.120
3.334	3 1/2	14	.083
3.358	4.000	3 1/2 XH IPS	.321
3.370	3 1/2	16	.065
3.495	3 5/8	16	.065
3.500	4.000	3 1/2 IPS	.250
3.510	3 3/4	11	.120
3.620	3 3/4	16	.065
3.760	4	11	.120
3.818	4.500	4 XH IPS	.341
3.870	4	16	.065
3.930	4	20	.035
3.995	4 1/8	16	.065
4.000	4.500	4 IPS	.250
4.010	4 1/4	11	.120
4.250	5.000	4 1/2 XH IPS	.375
4.260	4 1/2	11	.120
4.370	4 1/2	16	.065
4.500	5.000	4 1/2 IPS	.250
4.510	4 3/4	11	.120
4.760	5	11	.120
4.813	5.563	5 XH IPS	.375
4.870	5	16	.065
5.010	5 1/4	11	.120
5.062	5.563	5 IPS	.250
5.260	5 1/2	11	.120
5.510	5 3/4	11	.120
5.750	6.625	6 XH IPS	.437
5.760	6	11	.120
6.010	6 1/4	11	.120
6.125	6.625	6 IPS	.250
6.260	6 1/2	11	.120
6.510	6 3/4	11	.120
7.010	7 1/4	11	.120
7.062	7.625	7 IPS	.282
7.760	8	11	.120
8.000	8.625	8 IPS	.312
8.010	8 1/4	11	.120

Round Copper Tubes—Hard Drawn

Outside Diameters

Stubs Gauge

Stocked in 12 Foot Lengths and in 20 Foot Lengths as indicated

Size O. D.	I. D.	Wght. Lin. Ft.	Wt. Per 12 Ft. Lgth
No. 25 STUBS GAUGE—.020 WALL			
1	.962	.239	2.86
1 ⅛	1.087	.268	3.21
1 ¼	1.212	.299	3.58
1 ½	1.462	.360	4.32
No. 22 STUBS GAUGE—.028 WALL			
⅛	.069	.03304	.396
3/16	.1315	.05433	.651
¼	.194	.07562	.907
5/16	.2565	.09691	1.162
⅜	.319	.118	1.416
7/16	.3815	.139	1.668
½	.444	.161	1.932
9/16	.5065	.182	2.184
⅝	.569	.203	2.436
¾	.694	.246	2.952
⅞	.819	.289	3.468
1	.944	.331	3.972
No. 20 STUBS GAUGE—.035 WALL			
⅛	.055	.03832	.459
3/16	.1175	.06493	.779
¼	.180	.09155	1.098
5/16	.2425	.1182	1.418
⅜	.305	.145	1.740
7/16	.3675	.171	2.052
*½	.430	.198	2.376
*⅝	.555	.251	3.012
*¾	.680	.304	3.648
*⅞	.805	.358	4.296
*1	.930	.411	4.932
*1 ¼	1.18	.517	6.204
*1 ½	1.43	.624	7.488
*2	1.930	.837	10.04
No. 18 STUBS GAUGE—.049 WALL			
3/16	.0895	.08256	.990
¼	.152	.1198	1.437
5/16	.2145	.1571	1.885
⅜	.277	.194	2.328
½	.402	.269	3.228
⅝	.527	.343	4.116
¾	.652	.418	5.016
⅞	.777	.492	5.904
*1	.902	.567	6.804
*1 ¼	1.152	.716	8.592
*1 ½	1.402	.865	10.38
1 ¾	1.652	1.014	12.17
*2	1.902	1.163	13.96
No. 16 STUBS GAUGE—.065 WALL			
¼	.120	.146	1.752
5/16	.1825	.196	2.352
⅜	.245	.245	2.940
½	.370	.344	4.128
⅝	.495	.443	5.316
¾	.620	.542	6.504
⅞	.745	.640	7.680
*1	.870	.737	8.844
*1 ¼	1.12	.937	11.24
*1 ½	1.37	1.135	13.62
*1 ¾	1.62	1.332	15.98
*2	1.87	1.530	18.36
2 ¼	2.12	1.728	20.74
*2 ½	2.37	1.925	23.10
*3	2.87	2.321	27.85
*3 ½	3.37	2.716	32.59

*Items also stocked in 20 foot lengths.

Size O. D.	I. D.	Wght. Lin. Ft.	Wt. Per 20 Ft. Lgth.
No. 14 STUBS GAUGE—.083 WALL			
¾	.584	.673	13.46
1	.834	.926	18.52
1 ¼	1.084	1.178	23.56
1 ½	1.334	1.431	28.62
2	1.834	1.936	38.72
2 ½	2.334	2.440	48.80
3	2.834	2.945	58.90
4	3.834	3.955	79.10

Round Copper Tubes—Hard Drawn

Inside Diameters

Stocked in 20 Foot Lengths

I. D. Size	Stubs Ga. No.	Wght. Lin. Ft.	Wt. Per 20 Ft. Lgth
1	14	1.094	21.88
1	16	.842	16.84
1¼	10	2.256	45.12
1¼	12	1.802	36.04
1¼	14	1.346	26.92
1¼	16	1.040	20.80
1½	10	2.664	53.28
1½	12	2.134	42.68
1½	14	1.598	31.96
1½	16	1.238	24.76
2	10	3.479	69.58
2	12	2.797	55.94
2	14	2.103	42.06
2	16	1.633	32.66
2	18	1.221	24.42
2	20	.866	17.32
2½	10	4.294	85.88
2½	12	3.460	69.20
2½	14	2.608	52.16
2½	16	2.028	40.56
3	10	5.109	102.18
3	12	4.123	82.46
3	14	3.113	62.26
3	16	2.424	48.48
3½	10	5.924	118.48
3½	12	4.786	95.72
4	10	6.739	134.78
4	12	5.449	108.98
4	14	4.123	82.46
4	16	3.214	64.28
4½	12	6.112	122.24
5	10	8.369	167.38
5	12	6.775	135.50
5	16	4.005	80.10
6	10	9.999	199.98
6	12	8.101	162.02
6	16	4.796	95.92
8	10	13.260	265.20
8	12	10.752	215.04

For 45°, 90° Elbows and 180° Return Bends, see Tube Turns, page 114.

Soft Copper Tubing

Outside Diameters

Stubs Gauge

Random length Coils about 50 Feet

Size O.D.	Wght Lin. Ft.	Wght Per 25 Ft. Coil	Size O.D.	Wght Lin. Ft.	Wght Per 25 Ft. Coil	Size O.D.	Wght Lin. Ft.	Wght Per 25 Ft. Coil
WALL THICKNESS No. 22 STUBS GAUGE								
1/8	.03304	.82	1/4	.07562	1.89	3/8	.118	2.95
3/16	.05433	1.36	5/16	.09691	2.42	7/16	.139	3.47
						1/2	.161	4.25
WALL THICKNESS No. 20 STUBS GAUGE								
1/8	.03832	.96	3/8	.145	3.62	3/4	.304	7.60
3/16	.06493	1.62	7/16	.171	4.27	7/8	.358	8.95
1/4	.09155	2.29	1/2	.198	4.95	1	.411	10.27
5/16	.1182	2.95	5/8	.251	6.27			
WALL THICKNESS No. 18 STUBS GAUGE								
1/4	.1198	2.99	1/2	.269	6.72	1	.567	14.17
5/16	.1571	3.93	5/8	.343	8.57	1 1/4	.716	17.90
3/8	.194	4.85	3/4	.418	10.45	1 1/2	.865	21.62

Soft Copper Tubing

No. 20 B&S GAUGE—.032 In. WALL

In exact 25 Foot Coils—Packed in Cartons of 1 Coil Each.

Size O.D.	Wght. Per 25' Coil	Size O.D.	Wght. Per 25' Coil
1/8	.9 Lbs.	3/8	3.35 Lbs.
3/16	1.525	1/2	4.55
1/4	2.125	5/8	5.775
5/16	2.75	3/4	7.0

Soft Copper Tubing

5/16" O. D.—25 STUBS GAUGE—.020 WALL

In Exact Straight Lengths

Bright Finish

Length	Weight Per Ft.	Wght Per Length	Lengths Per Lb.
30"	.07117	.17792	5.63
33"	.07117	.19572	5.12
36"	.07117	.21352	4.69

Soft Copper Refrigerator Tubing

Dehydrated with Sealed Ends

Random Length Coils about 50 Feet

Outside Diameters

WALL THICKNESS No. 20 STUBS GAUGE

	NOT TINNED					TINNED Electro Tinned Outside Only		
Size O. D.	Weight Lin. Ft.	Wt. Per 50 Ft. Coil	Size O. D.	Weight Lin. Ft.	Wt. Per 50 Ft. Coil	Size O. D.	Weight Lin. Ft.	Wt. Per 50 Ft. Coil
1/8	.03832	1.92	1/2	.198	9.90	1/4	.09155	4.58
3/16	.06493	3.25	5/8	.251	12.55	3/8	.145	7.25
1/4	.09155	4.58	3/4	.304	15.20	1/2	.198	9.90
5/16	.1182	5.91	7/8	.358	17.90	5/8	.251	12.55
3/8	.145	7.25	1	.411	20.55			
7/16	.171	8.55						

For Automotive and Refrigeration Fittings and Valves, see Page 87.
For Copper Water or Service Tubing, see Page 39.

Seamless Brass Pipe

Standard Iron Pipe Sizes

Exact 12, 18, and 20 Foot Lengths

Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛	.281	.405	.062	.246	2.952	2½	2.500	2.875	.188	5.830	69.96
¼	.375	.540	.083	.437	5.244	3	3.062	3.500	.219	8.314	99.76
⅜	.494	.675	.0905	.612	7.344	3½	3.500	4.000	.250	10.85	130.2
½	.625	.840	.1075	.911	10.93	4	4.000	4.500	.250	12.29	147.4
¾	.822	1.050	.114	1.235	14.82	4½	4.500	5.000	.250	13.74	164.8
1	1.062	1.315	.126	1.740	20.88	5	5.062	5.563	.250	15.40	184.8
1¼	1.368	1.660	.146	2.557	30.68	6	6.125	6.625	.250	18.44	221.2
1½	1.600	1.900	.150	3.037	36.44	*7	7.062	7.625	.282	23.92	287.04
2	2.062	2.375	.157	4.017	48.20	*8	8.000	8.625	.312	30.05	360.6

* Carried in 12 Foot Lengths only.

Seamless Brass Pipe

Extra Heavy—Iron Pipe Sizes

Exact 12, 18, and 20 Foot Lengths

Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛	.205	.405	.100	.353	4.236	2	1.933	2.375	.221	5.508	66.09
¼	.294	.540	.123	.593	7.116	2½	2.315	2.875	.280	8.407	100.88
⅜	.421	.675	.127	.805	9.660	3	2.892	3.500	.304	11.24	134.88
½	.542	.840	.149	1.191	14.29	*3½	3.358	4.000	.321	13.66	163.92
¾	.736	1.050	.157	1.622	19.46	*4	3.818	4.500	.341	16.41	196.92
1	.951	1.315	.182	2.386	28.63	*4½	4.250	5.000	.375	20.07	240.84
1¼	1.272	1.660	.194	3.291	39.49	*5	4.813	5.563	.375	22.52	270.24
1½	1.494	1.900	.203	3.986	47.83	*6	5.750	6.625	.437	31.32	375.84

* Carried in 12 Foot Lengths only.

Seamless Red Brass Pipe

Standard Iron Pipe Sizes

Exact 12, 18, and 20 Foot Lengths

Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛	.281	.405	.062	.253	3.036	1½	1.600	1.900	.150	3.13	37.56
¼	.375	.540	.083	.450	5.400	2	2.062	2.375	.157	4.14	49.68
⅜	.494	.675	.0905	.630	7.560	2½	2.500	2.875	.188	6.00	72.00
½	.625	.840	.1075	.938	11.256	3	3.062	3.500	.219	8.56	102.72
¾	.822	1.050	.114	1.27	15.24	*3½	3.500	4.000	.250	11.17	134.04
1	1.062	1.315	.126	1.79	21.48	*4	4.000	4.500	.250	12.66	151.92
1¼	1.368	1.660	.146	2.63	31.56						

* Carried in 12 Foot Lengths only.

For Brass Pipe Fittings Refer to Page 129.

Seamless Copper Pipe

Standard Iron Pipe Sizes

Exact 12, 15, and 20 Foot Lengths

Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛	.281	.405	.062	.259	3.108	2	2.062	2.375	.157	4.224	50.68
¼	.375	.540	.083	.459	5.508	2½	2.500	2.875	.188	6.130	73.56
⅜	.494	.675	.0905	.644	7.728	3	3.062	3.500	.219	8.741	104.8
½	.625	.840	.1075	.958	11.49	3½	3.500	4.000	.250	11.41	136.9
¾	.822	1.050	.114	1.298	15.57	4	4.000	4.500	.250	12.93	155.1
1	1.062	1.315	.126	1.829	21.94	4½	4.500	5 000	.250	14.44	173.2
1¼	1.368	1.660	.146	2.689	32.26	5	5.062	5.563	.250	16.19	194.2
1½	1.600	1.900	.150	3.193	38.31	6	6.125	6.625	.250	19.39	232.6

For Extra Heavy Seamless Copper pipe see following page.

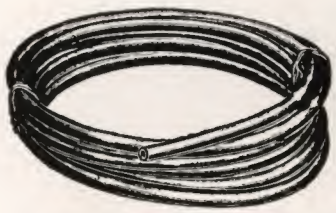
Seamless Copper Pipe

Extra Heavy—Iron Pipe Sizes

Exact 12 Foot Lengths

Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth	Size	Exact I. D.	Exact O. D.	Wall Thickness	Wght Lin. Ft.	Wght Per 12 Ft. Lgth
⅛	.205	.405	.100	.371	4.452	2	1.933	2.375	.221	5.791	69.49
¼	.294	.540	.123	.624	7.488	2½	2.315	2.875	.280	8.839	106.0
⅜	.421	.675	.127	.847	10.16	3	2.892	3.500	.304	11.82	141.8
½	.542	.840	.149	1.253	15.03	3½	3.358	4.000	.321	14.37	172.4
¾	.736	1.050	.157	1.706	20.47	4	3.818	4.500	.341	17.25	207.0
1	.951	1.315	.182	2.509	30.10	4½	4.250	5.000	.375	21.10	253.2
1¼	1.272	1.660	.194	3.460	41.52	5	4.813	5.563	.375	23.69	284.2
1½	1.494	1.900	.203	4.191	50.29	6	5.750	6.625	.437	32.93	395.1

Copper Water Service Tubing



In coils and straight lengths.

This copper tubing is built to withstand any pressure or strain of city water service. The soft tempered tubing due to its flexibility is particularly adapted for replacements in confined places. Fittings for COPPER SERVICE TUBING will be found on page 112, 113.

Type "K"—Extra Heavy **Type "L"—Standard** **Type "M"—Light**

"K," "L" and "M" stocked in Hard Temper Straight 20 Foot Lengths up to 3". "K" and "L" stocked in Soft Temper 60 Foot Coils up to and including 1 inch. "K" and "L" stocked in Soft Temper 20 Foot Straight Lengths including 1 inch and over.

Size Inch	"K" "L" "M" O. D.	"K" Wall Thickness	"L" Wall Thickness	"M" Wall Thickness	"K" Wght Per Foot	"L" Wght Per Foot	"M" Wght Per Foot
⅛	.250	.032	.025	.025	.085	.068	.068
¼	.375	.032	.030	.025	.134	.126	.106
⅜	.500	.049	.035	.025	.269	.198	.144
½	.625	.049	.040	.028	.344	.285	.203
¾	.875	.065	.045	.032	.641	.455	.328
1	1.125	.065	.050	.035	.839	.655	.464
1¼	1.375	.065	.055	.042	1.04	.884	.681
1½	1.625	.072	.060	.049	1.36	1.14	.94
2	2.125	.083	.070	.058	2.06	1.75	1.46
2½	2.625	.095	.080	.065	2.92	2.48	2.03
3	3.125	.109	.090	.072	4.00	3.33	2.68

Admiralty Condenser Tubes

Stubs Gauge

Wall Thickness
No. **18** Ga.—Dec. Inch .049

Outside Diam. Inch	Wght. Lin. Ft.
⅝	.337
¾	.409
⅞	.482
1	.555

Wall Thickness
No. **17** Ga.—Dec. Inch .058

Outside Diam. Inch	Wght. Lin. Ft.
⅝	.391
¾	.478
⅞	.564
1	.651

Wall Thickness
No. **16** Ga.—Dec. Inch .065

Outside Diam. Inch	Wght. Lin. Ft.
⅝	.434
¾	.530
⅞	.627
1	.724

Standard Aluminum Pipe—I. P. S.—Hard Drawn

Temper Designation 2SH

I. P. S. Size In.	Outside Diam. In.	Inside Diam In.	Wght. Lin. Ft.	Wght. Lbs. 12 Feet	I. P. S. Size In.	Outside Diam. In.	Inside Diam In.	Wght. Lin. Ft.	Wght. Lbs. 12 Feet
⅛	.405	.270	.085	1.02	1	1.315	1.048	.582	6.984
¼	.540	.364	.147	1.764	1¼	1.660	1.380	.794	9.528
⅜	.675	.494	.195	2.34	1½	1.900	1.611	.941	11.292
½	.840	.623	.294	3.528	2	2.375	2.067	1.260	15.120
¾	1.050	.824	.388	4.656					

For Aluminum Pipe Fittings, see Page 130.

Round Aluminum Tubes—Hard

12-Foot Lengths

Stubs Gauge

Temper Designation 2SH

Size O. D. Inch	Wght. Lineal Ft.	Wght. Per 12 Ft. Length
	NO. 23 GAUGE—.025	
1/4	.020	.240
5/16	.026	.312
3/8	.031	.372
7/16	.037	.444
1/2	.043	.516
5/8	.054	.648
3/4	.066	.792
7/8	.077	.924
1	.089	1.068
	NO. 22 GAUGE—.028	
1/4	.023	.276
5/16	.029	.348
1/2	.049	.588
5/8	.061	.732
3/4	.074	.888
1	.100	1.2
	NO. 20 GAUGE—.035	
3/16	.019	.228
1/4	.027	.324
5/16	.035	.420
3/8	.043	.516
1/2	.059	.708
5/8	.075	.900
3/4	.091	1.09
7/8	.107	1.28
1	.123	1.47
1 1/8	.139	1.66
1 1/4	.155	1.86

Size O. D. Inch	Wght. Lineal Ft.	Wght. Per 12 Ft. Length
	NO. 18 GAUGE—.049	
1/4	.036	.432
3/8	.058	.696
1/2	.080	.960
5/8	.103	1.236
3/4	.125	1.50
7/8	.147	1.76
1	.170	2.04
1 1/8	.193	2.31
1 1/4	.216	2.59
2	.35	4.20
2 1/2	.44	5.28
3	.53	6.36
	NO. 16 GAUGE—.065	
1/2	.104	1.24
5/8	.133	1.59
3/4	.163	1.95
7/8	.193	2.31
1	.222	2.66
1 1/4	.275	3.30
1 3/8	.313	3.76
1 1/2	.344	4.13
1 3/4	.40	4.80
2	.48	5.76
2 1/2	.59	7.08
3	.75	9.00

Round Seamless Steel Tubes

COLD DRAWN—ANNEALED FINISH

O. D. Inch	I. D. Inch	Wght. Lin. Ft.
	24 STUBS GAUGE—.022 INCH WALL	
3/16	.144	.039
1/4	.206	.054
5/16	.269	.068
3/8	.331	.083
7/16	.394	.098
1/2	.456	.112
9/16	.519	.127
	22 STUBS GAUGE—.028 INCH WALL	
3/16	.132	.048
1/4	.194	.066
5/16	.257	.085
3/8	.319	.104
7/16	.382	.122
1/2	.444	.141
9/16	.507	.160
5/8	.569	.178

O. D. Inch	I. D. Inch	Wght. Lin. Ft.
5/8	.581	.142
11/16	.644	.156
3/4	.706	.171
13/16	.769	.186
7/8	.831	.200
15/16	.894	.215
11/16	.632	.197
3/4	.694	.216
13/16	.757	.234
7/8	.819	.253
15/16	.882	.272
1	.944	.290
1 1/16	1.006	.309

O. D. Inch	I. D. Inch	Wght. Lin. Ft.
1	.956	.230
1 1/16	1.019	.244
1 1/8	1.081	.259
1 3/16	1.144	.274
1 1/4	1.206	.288
1 5/16	1.269	.303
1 3/8	1.331	.318
1 1/8	1.069	.328
1 3/16	1.132	.346
1 1/4	1.194	.365
1 5/16	1.257	.384
1 3/8	1.319	.402
1 1/2	1.444	.440
2	1.944	.589

Inquiries for sizes not listed given special attention.

Round Seamless Steel Tubes

O. D. Inch	I. D. Inch	Wght. Lin. Ft.
20 STUBS GAUGE—.035 INCH WALL		
3/16	.118	.057
1/4	.180	.080
5/16	.243	.104
3/8	.305	.127
7/16	.368	.150
1/2	.430	.174
9/16	.493	.197
5/8	.555	.220
11/16	.618	.244
3/4	.680	.267
18 STUBS GAUGE—.049 INCH WALL		
3/16	.090	.072
1/4	.152	.105
5/16	.215	.138
3/8	.277	.170
7/16	.340	.203
1/2	.402	.236
9/16	.465	.268
5/8	.527	.301
11/16	.590	.334
3/4	.652	.367
13/16	.715	.399
16 STUBS GAUGE—.065 INCH WALL		
3/16	.058	.085
1/4	.120	.128
5/16	.183	.172
3/8	.245	.215
7/16	.308	.258
1/2	.370	.302
9/16	.433	.345
5/8	.495	.388
11/16	.558	.432
3/4	.620	.475
13/16	.683	.518
7/8	.745	.562
14 STUBS GAUGE—.083 INCH WALL		
3/8	.209	.259
7/16	.272	.314
1/2	.334	.369
9/16	.397	.425
5/8	.459	.480
11/16	.522	.535
3/4	.584	.591
13/16	.647	.650
7/8	.709	.701
15/16	.772	.757
1	.834	.812
13 STUBS GAUGE—.095 INCH WALL		
3/8	.185	.284
7/16	.248	.347
1/2	.310	.411
9/16	.373	.474
5/8	.435	.537
11/16	.498	.601
3/4	.560	.664
13/16	.623	.727
7/8	.685	.791
15/16	.748	.854
11 STUBS GAUGE—.120 INCH WALL		
3/8	.135	.327
7/16	.198	.407
1/2	.260	.487
9/16	.323	.567
5/8	.385	.647
11/16	.448	.727
3/4	.510	.807
13/16	.573	.887
7/8	.635	.967
15/16	.698	1.047
1	.760	1.127
1 1/16	.823	1.207

O. D. Inch	I. D. Inch	Wght. Lin. Ft.
20 STUBS GAUGE—.035 INCH WALL		
13/16	.743	.290
7/8	.805	.314
15/16	.868	.337
1	.930	.360
1 1/16	.993	.384
1 1/8	1.055	.407
1 3/16	1.118	.430
1 1/4	1.180	.454
1 5/16	1.243	.477
18 STUBS GAUGE—.049 INCH WALL		
7/8	.777	.432
15/16	.840	.465
1	.902	.497
1 1/16	.965	.530
1 1/8	1.027	.563
1 3/16	1.090	.595
1 1/4	1.152	.628
1 5/16	1.215	.661
1 3/8	1.277	.693
1 7/16	1.340	.726
16 STUBS GAUGE—.065 INCH WALL		
15/16	.808	.605
1	.870	.648
1 1/16	.933	.692
1 1/8	.995	.735
1 3/16	1.058	.778
1 1/4	1.120	.822
1 5/16	1.183	.865
1 3/8	1.245	.909
1 7/16	1.308	.952
1 1/2	1.370	.995
1 5/8	1.495	1.082
14 STUBS GAUGE—.083 INCH WALL		
1 1/16	.897	.867
1 1/8	.959	.923
1 3/16	1.022	.978
1 1/4	1.084	1.033
1 5/16	1.147	1.089
1 3/8	1.209	1.144
1 7/16	1.272	1.199
1 1/2	1.334	1.255
1 5/8	1.459	1.366
1 3/4	1.584	1.476
1 7/8	1.709	1.587
13 STUBS GAUGE—.095 INCH WALL		
1	.810	.917
1 1/16	.873	.981
1 1/8	.935	1.044
1 3/16	.998	1.107
1 1/4	1.060	1.171
1 5/16	1.123	1.234
1 3/8	1.185	1.297
1 7/16	1.248	1.361
1 1/2	1.310	1.424
1 5/8	1.435	1.551
11 STUBS GAUGE—.120 INCH WALL		
1 1/8	.885	1.287
1 3/16	.948	1.367
1 1/4	1.010	1.447
1 5/16	1.073	1.527
1 3/8	1.135	1.607
1 7/16	1.198	1.687
1 1/2	1.260	1.767
1 5/8	1.385	1.927
1 3/4	1.510	2.087
1 7/8	1.635	2.247
2	1.760	2.407
2 1/8	1.885	2.567

O. D. Inch	I. D. Inch	Wght. Lin. Ft.
1 3/8	1.305	.500
1 7/16	1.368	.524
1 1/2	1.430	.547
1 5/8	1.555	.594
1 3/4	1.680	.640
1 7/8	1.805	.687
2	1.930	.734
2 1/8	2.055	.780
2 1/4	2.180	.827
1 1/2	1.402	.759
1 5/8	1.527	.824
1 3/4	1.652	.889
1 7/8	1.777	.955
2	1.902	1.020
2 1/8	2.027	1.085
2 1/4	2.152	1.151
2 1/2	2.402	1.281
2 3/4	2.652	1.412
3	2.902	1.543
1 3/4	1.620	1.169
1 7/8	1.745	1.255
2	1.870	1.342
2 1/8	1.995	1.429
2 1/4	2.120	1.515
2 3/8	2.245	1.602
2 1/2	2.370	1.689
2 3/4	2.620	1.862
3	2.870	2.035
3 1/2	3.370	2.382
4	3.870	2.729
2	1.834	1.698
2 1/8	1.959	1.808
2 1/4	2.084	1.919
2 3/8	2.209	2.030
2 1/2	2.334	2.140
2 3/4	2.584	2.362
3	2.834	2.583
3 1/2	3.334	3.026
4	3.834	3.469
5	4.834	4.359
1 3/4	1.560	1.677
1 7/8	1.685	1.804
2	1.810	1.931
2 1/8	1.935	2.058
2 1/4	2.060	2.184
2 3/8	2.185	2.311
2 1/2	2.310	2.438
2 3/4	2.560	2.691
3	2.810	2.944
3 1/4	3.060	3.198
3 1/2	3.310	3.451
2 1/4	2.010	2.727
2 3/8	2.135	2.887
2 1/2	2.260	3.047
2 3/4	2.510	3.367
3	2.760	3.687
3 1/4	3.010	4.007
3 1/2	3.260	4.327
3 3/4	3.510	4.647
4	3.760	4.967
4 1/4	4.010	5.288
4 1/2	4.260	5.608
4 3/4	4.510	5.928

Inquiries for sizes not listed given special attention.

Round Seamless Steel Tubes

O. D. Inch	I. D. Inch	Wght. Lin. Ft.	O. D. Inch	I. D. Inch	Wght. Lin. Ft.	O. D. Inch	I. D. Inch	Wght. Lin. Ft.
			5/32—.15625 INCH WALL					
11/16	.375	.886	1 1/4	.938	1.823	2 1/8	1.813	3.282
3/4	.438	.990	1 5/16	1.000	1.928	2 1/4	1.938	3.490
13/16	.500	1.094	1 3/8	1.063	2.032	2 3/8	2.063	3.699
7/8	.563	1.198	1 1/2	1.188	2.240	2 1/2	2.188	3.907
15/16	.625	1.302	1 5/8	1.313	2.448	2 3/4	2.438	4.324
1	.688	1.407	1 3/4	1.438	2.657	3	2.688	4.741
1 1/16	.750	1.511	1 7/8	1.563	2.865	3 1/4	2.938	5.157
1 1/8	.813	1.615	2	1.688	3.074	3 1/2	3.188	5.574
1 3/16	.875	1.719				4	3.688	6.408
			3/16—.1875 INCH WALL					
5/8	.250	.875	1 5/16	.938	2.251	2 3/8	2.000	4.376
11/16	.313	1.000	1 3/8	1.000	2.376	2 1/2	2.125	4.626
3/4	.375	1.125	1 7/16	1.063	2.501	2 3/4	2.375	5.126
13/16	.438	1.250	1 1/2	1.125	2.626	3	2.625	5.626
7/8	.500	1.375	1 5/8	1.250	2.876	3 1/4	2.875	6.126
15/16	.563	1.500	1 3/4	1.375	3.126	3 1/2	3.125	6.626
1	.625	1.625	1 7/8	1.500	3.376	3 3/4	3.375	7.127
1 1/16	.688	1.750	2	1.625	3.626	4	3.625	7.627
1 1/8	.750	1.875	2 1/8	1.750	3.876	4 1/4	3.875	8.127
1 3/16	.813	2.000	2 1/4	1.875	4.126	4 1/2	4.125	8.627
1 1/4	.875	2.125				4 3/4	4.375	9.127
			1/4—.250 INCH WALL					
3/4	.250	1.334	1 7/16	.938	3.167	2 3/4	2.250	6.668
13/16	.313	1.500	1 1/2	1.000	3.340	3	2.500	7.335
7/8	.375	1.667	1 5/8	1.125	3.667	3 1/4	2.750	8.002
15/16	.438	1.834	1 3/4	1.250	4.001	3 1/2	3.000	8.669
1	.500	2.000	1 7/8	1.375	4.334	3 3/4	3.250	9.335
1 1/16	.563	2.167	2	1.500	4.668	4	3.500	10.002
1 1/8	.625	2.334	2 1/8	1.625	5.001	4 1/4	3.750	10.670
1 3/16	.688	2.501	2 1/4	1.750	5.334	4 1/2	4.000	11.336
1 1/4	.750	2.667	2 3/8	1.875	5.668	4 3/4	4.250	12.002
1 5/16	.813	2.834	2 1/2	2.000	6.001	5	4.500	12.669
1 3/8	.875	3.001				6	5.500	15.340
			5/16—.3125 INCH WALL					
7/8	.250	1.875	1 3/8	.750	3.542	2 3/8	1.750	6.876
15/16	.313	2.084	1 1/2	.875	3.959	2 1/2	1.875	7.293
1	.375	2.292	1 5/8	1.000	4.376	2 3/4	2.125	8.127
1 1/16	.438	2.501	1 3/4	1.125	4.793	3	2.375	8.960
1 1/8	.500	2.709	1 7/8	1.250	5.209	3 1/4	2.625	9.794
1 3/16	.563	2.917	2	1.375	5.626	3 1/2	2.875	10.627
1 1/4	.625	3.126	2 1/8	1.500	6.043	4	3.375	12.294
1 5/16	.688	3.334	2 1/4	1.625	6.460			
			3/8—.375 INCH WALL					
15/16	.188	2.251	1 1/2	.750	4.501	2 1/2	1.750	8.502
1	.250	2.501	1 5/8	.875	5.001	2 3/4	2.000	9.500
1 1/16	.313	2.751	1 3/4	1.000	5.501	3	2.250	10.502
1 1/8	.375	3.001	1 7/8	1.125	6.001	3 1/4	2.500	11.502
1 3/16	.438	3.251	2	1.250	6.501	3 1/2	2.750	12.503
1 1/4	.500	3.501	2 1/8	1.375	7.001	3 3/4	3.000	13.503
1 5/16	.563	3.751	2 1/4	1.500	7.502	4	3.250	14.503
1 3/8	.625	4.001	2 3/8	1.625	8.002	4 1/2	3.750	16.500
			7/16—.4375 INCH WALL					
2 3/8	1.500	9.004	2 1/2	1.625	9.627	4	3.125	16.628
			1/2—.500 INCH WALL					
1 1/2	.500	5.334	2 3/4	1.750	12.002	4	3.000	18.671
1 3/4	.750	6.668	3	2.000	13.336	4 1/2	3.500	21.340
2	1.000	8.002	3 1/4	2.250	14.670	4 3/4	3.750	22.671
2 1/4	1.250	9.335	3 1/2	2.500	16.003	5	4.000	24.005
2 1/2	1.500	10.669	3 3/4	2.750	17.337	6	5.000	29.340
			5/8—.625 INCH WALL					
3	1.750	15.837	4	2.750	22.505	5	3.750	29.173
			3/4—.750 INCH WALL					
3	1.500	18.004	4 1/2	3.00	30.006	5	3.500	34.007
			4 3/4	3.250	32.007			

Inquiries for sizes not listed receive special attention. Direct mill shipments are solicited if time and quantity permit.

Stainless Steel Seamless Tubes

18 & 8 Chromium-Nickel

ALLEGHENY METAL

Stainless Type No. 304

Round—Annealed and Pickled Finish
Inside and Outside
Random Lengths 4′ to 24′

16 STUBS GAUGE—.065

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
3/8	.245	.215	2.58
1/2	.370	.302	3.624
3/4	.620	.475	5.70
1	.870	.648	7.776
1 1/4	1.120	.822	9.864
1 1/2	1.370	.996	11.952
2	1.870	1.340	16.08

18 STUBS GAUGE—.049

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1/4	.152	.105	1.26
3/8	.277	.170	2.04
1/2	.402	.236	2.832
3/4	.652	.367	4.404
1	.902	.497	5.964
1 1/4	1.152	.628	7.536
1 1/2	1.402	.759	9.108

Round—Polished Inside
Annealed and Pickled Outside
Cold Drawn—Exact 12 Foot Lengths

16 STUBS GAUGE—.065

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1	.870	.648	7.776
1 1/2	1.370	.996	11.952
2	1.870	1.340	16.08

18 STUBS GAUGE—.049

Size O. D.	I. D.	Wght. Lin. Ft.	Wght. Per 12 Ft. Lgth
1	.902	.497	5.964
1 1/2	1.402	.759	9.108
2	1.902	1.021	12.252

Standard Pipe Sizes—Plain Ends

Random Lengths 4′ to 24′—Annealed and Pickled Finish Inside and Outside

Size	O. D.	I. D.	Wall	Wght. Lin. Ft.	Wgth. Per 12 Ft. Lgth
1/8	.405	.269	.068	.2447	2.936
1/4	.540	.364	.088	.4248	5.097
3/8	.675	.493	.091	.5676	6.811
1/2	.840	.622	.109	.8510	10.212
3/4	1.050	.824	.113	1.131	13.572
1	1.315	1.049	.133	1.679	20.148
1 1/4	1.660	1.380	.140	2.273	27.276
1 1/2	1.900	1.610	.145	2.718	32.616
2	2.375	2.067	.154	3.653	43.836

For Stainless Steel Pipe Fittings, see Pages 130, 131.
For Stainless Steel Valves, see Page 122.

Architectural Tubes

ALLEGHENY METAL

Inside Lock Joint—Supplied with Reinforcing Steel Inserts—Polished Outside

ROUND

Size O. D.	Stainless Wall Inch	Stainless Wght. Lin. Ft.	Carbon Steel Inserts Size	Gauge	Wght. Lin. Ft.
5/8	.018	.1378	5/8	20	.225
3/4	.018	.1655	3/4	20	.276
7/8	.018	.1890	7/8	20	.323
1	.020	.2385	1	18	.527
1 1/4	.026	.3868	1 1/4	18	.659
1 1/2	.028	.4962	1 1/2	16	1.008
1.90	.035	.7810	1.90	16	1.264

SQUARE

Size O. D.	Wall Inch	Wght. Lin. Ft.
11/16	.018	.1890
13/16	.020	.2385
1	.026	.3868
1 3/16	.028	.4962
1 1/2	.035	.7810

RECTANGULAR

3/8 x 1	.018	.1890
1/2 x 1 1/8	.020	.2385
1/2 x 1 1/2	.026	.3868
1 x 1 3/8	.028	.4962
1 x 2	.035	.7810

For Stainless Steel Railing Fittings, see Page 131.

Seamless Phosphor Bronze Tubing

Drawn to Exact Measurement with Finished Bearing Surface Inside. For Bearings and Bushings.

Stocked in Random Lengths

O. D. Inch	I. D. Inch	Wght. Lin. Ft.	O. D. Inch	I. D. Inch	Wght. Lin. Ft.	O. D. Inch	I. D. Inch	Wght. Lin. Ft.	O. D. Inch	I. D. Inch	Wght. Lin. Ft.
3/8	1/4	.238	7/8	5/8	1.019	1 1/8	7/8	1.351	1 3/4	1 1/4	4.562
1/2	3/8	.333	7/8	3/4	.472	1 1/4	3/4	2.896	1 3/4	1 3/8	3.564
5/8	3/8	.760	1	1/2	2.183	1 1/4	1	1.518	1 3/4	1 1/2	2.471
5/8	1/2	.428	1	5/8	1.732	1 1/4	1 1/8	.686	1 3/4	1 5/8	1.283
3/4	1/2	.950	1	3/4	1.185	1 1/2	3/4	5.132	2	1 1/4	7.413
3/4	9/16	.748	1	7/8	.544	1 1/2	1	3.802	2	1 1/2	5.322
3/4	5/8	.523	1 1/8	5/8	2.539	1 1/2	1 1/4	2.091	2	1 3/4	2.851
7/8	1/2	1.470	1 1/8	3/4	1.993	1 3/4	1	6.273			

On Pages 143 to 147 are listed a complete stock of finished Bunting Bronze Bearings, machined and centered bars and cored bars.

Soft High Brass Wire

Brown & Sharpe Gauge

Gauge No.	Diam. Inch	Wght. Lin. Ft.
3/8	.375	.4074
5/16	.3125	.2829
1	.2893	.2411
2	.2576	.1912
1/4	.250	.1811
3	.2294	.1516
6	.1620	.07563
7	.1443	.05998
8	.1285	.04756
9	.1144	.03772
10	.1019	.02991
11	.09074	.02372
12	.08081	.01881
13	.07196	.01492
14	.06408	.01183
15	.05707	.009383
16	.05082	.007441
17	.04526	.005901
18	.04030	.004679
19	.03589	.003711
20	.03196	.002943
21	.02846	.002334

Random Weight Coils

Gauge No.	Diam. Inch	Wght. Lin.Ft.
22	.02535	.001851
23	.02257	.001468
24	.02010	.001164
25	.01790	.0009231
26	.01594	.0007321
*27	.01420	.0005805
*28	.01264	.0004604
*29	.01126	.0003651
*30	.01003	.0002896
*31	.008928	.0002297
*32	.007950	.0001821

*Carried in spools only.

Spring Brass Wire

Brown & Sharpe Gauge

Gauge No.	Diam. Inch	Wght. Lin. Ft.
0	.3249	.3018
1	.2893	.2411
2	.2576	.1912
3	.2294	.1516
4	.2043	.1203
5	.1819	.09537
6	.1620	.07563
7	.1443	.05998
8	.1285	.04756
9	.1144	.03772
10	.1019	.02991
11	.09074	.02372
12	.08081	.01881
13	.07196	.01492
14	.06408	.01183
15	.05707	.009383
16	.05082	.007441
17	.04526	.005901

Random Weight Coils

Gauge No.	Diam. Inch	Wght. Lin.Ft.
18	.04030	.004679
19	.03589	.003711
20	.03196	.002943
21	.02846	.002334
22	.02535	.001851
23	.02257	.001468
24	.02010	.001164
25	.01790	.0009231
26	.01594	.0007321

Phosphor Bronze Spring Wire

Brown & Sharpe Gauge

Gauge No.	Diam. Inch	Wght. Lin. Ft.
0	.3249	.31945
1	.2893	.25334
2	.2576	.20091
3	.2294	.15932
4	.2043	.12635
5	.1819	.10020
6	.1620	.07946
7	.1443	.06301
8	.1285	.04998
9	.1144	.03964
10	.1019	.03143
11	.09074	.024924
12	.08081	.01977
13	.07196	.01567
14	.06408	.01244
15	.05707	.00986
16	.05082	.00782
17	.04526	.00619
18	.04030	.00492
19	.03589	.00389
20	.03196	.00309
21	.02846	.00245

Random Weight Coils

Gauge No.	Diam. Inch	Wght. Lin.Ft.
22	.02535	.00194
24	.02010	.00122
26	.01594	.00077
28	.01264	.00048
*30	.01003	.0003046
*32	.00795	.0001915
*34	.00630	.0001205

*Carried in Spools Only.

Aluminum Wire—Half Hard

Temper designation 2S4

Gauge No.	Decimal Inch	Wght. Lin. Ft.
6	.162	.0242
8	.128	.0151
9	.114	.0120
10	.101	.0095
11	.090	.0076
12	.080	.0060
14	.064	.0038
16	.050	.0023
18	.040	.0014
20	.031	.0009
22	.025	.0006

18% Nickel Silver Wire—Hard

Brown & Sharpe Gauge

Gauge No.	Decimal Inch	Wght. Lin. Ft.
6	.162	.07759
7	.144	.06153
8	.128	.04879
9	.114	.03870
10	.101	.03069
11	.090	.02434
12	.080	.01930
13	.071	.01531
14	.064	.01214
15	.057	.009626
16	.050	.007633
17	.045	.006053
18	.040	.004801
19	.035	.003807

Random Weight Coils

Gauge No.	Decimal Inch	Wght. Lin. Ft.
20	.031	.003019
21	.028	.002394
22	.025	.001899
23	.022	.001506
24	.020	.001194
25	.017	.000947
26	.015	.000751

For Malin's Spool Wire, see Page 46.

Bare Soft Copper Wire

Brown & Sharpe Gauge

Gauge No.	Diam. Inch	Wght. Lin. Ft.
0000	.4600	.6412
000	.4096	.5085
00	.3648	.4053
0	.3249	.3198
1	.2893	.2536
2	.2576	.2011
3	.2294	.1595
4	.2043	.1265
5	.1819	.1003
6	.1620	.07955
7	.1443	.06309
8	.1285	.05003
9	.1144	.03968
10	.1019	.03146
11	.09074	.0249
12	.08081	.01979
13	.07196	.01569
14	.06408	.01244
15	.05707	.009869
16	.05082	.007827
17	.04526	.006207
18	.04030	.004922
19	.03589	.003904
20	.03196	.003096
21	.02846	.002455
22	.02535	.001947

Random Weight Coils

Gauge No.	Diam. Inch	Wght. Lin. Ft.
23	.02257	.001544
24	.02010	.001224
*26	.01594	.0007695
*28	.01264	.0004850
*30	.01003	.0003046
*31	.00893	.0002415
*32	.00795	.0001915
*33	.00708	.0001519
*34	.00630	.0001205

* Carried in Spools Only.

Tie Wires

Bare Soft Copper Wire—14" Lengths

Gauge No.	Diam. Inch	Wt. Lbs. Lin. Ft.	No. Wires Per Lb.
14	.06408	.01244	68
16	.05082	.007827	109

For Copper Nails, see Page 76.

Bare Hard Copper Wire

Brown & Sharpe Gauge

Gauge No.	Decimal Inch	Wght. Lin. Ft.
1	.2893	.2536
2	.2576	.2011
3	.2294	.1595
4	.2043	.1265
6	.1620	.07955
8	.1285	.05003
10	.1019	.03146
12	.08081	.01979
14	.06408	.01244
16	.05082	.007827
18	.04030	.004922
20	.03196	.003096
22	.02535	.001947
24	.02010	.001224

Random Weight Coils

Spring Silicon Bronze Wire

A high copper-silicon alloy with tensile strength comparable to steel.

Brown & Sharpe Gauge

Gauge No.	Diam. Inch	Wght. Lin. Ft.
0	.3249	.31945
1	.2893	.25334
2	.2576	.20091
3	.2294	.15932
4	.2043	.12635
5	.1819	.10020
6	.1620	.07946
7	.1443	.06301
8	.1285	.04998
9	.1144	.03964
10	.1019	.03143
11	.09074	.024924
12	.08081	.01977
13	.07196	.01567
14	.06408	.01244
15	.05707	.00986
16	.05082	.00782
17	.04526	.00619
18	.04030	.00492
19	.03589	.00389
20	.03196	.00309
21	.02846	.00245
22	.02535	.00194
24	.02010	.00122
26	.01594	.00077
28	.01264	.00048

Random Weight Coils

Malin's Spool Wire

SOFT BRASS WIRE—SPRING BRASS WIRE—SOFT COPPER WIRE—LIST PRICES PER DOZEN

W&M Gauge	14	16	18	20	22	24	26	28	30	32	34	36
1 oz. Spool	$ 0.90	$ 1.00	$ 1.00	$ 1.00	$ 1.05	$ 1.10	$ 1.20	$ 1.30	$ 1.50	$ 1.70	$ 2.00	$ 2.80
2 oz. "	1.40	1.55	1.60	1.60	1.70	1.85	1.90	2.15	2.50	2.85	3.40	4.00
¼ lb. "	2.10	2.20	2.30	2.35	2.50	2.65	2.75	3.10	3.55	4.15	4.75	5.65
½ lb. "	4.20	4.40	4.60	4.70	5.00	5.30	5.50	6.20	7.10	8.30	9.50	11.30
1 lb. "	8.20	8.60	9.00	9.15	9.75	10.35	10.70	12.10	13.85	16.20	18.50	22.05
2 lb. "	16.40	17.20	18.00	18.30	19.50	20.70	21.40	24.20	27.70	32.40	37.00	44.10
5 lb. "	40.00	42.00	44.00	44.50	47.50	50.45	52.15	59.00	67.50	78.95	90.20	107.50

Phosphor Bronze Wire—18% Nickel Silver Wire

Spring Temper—B & S Gauge

List Prices Per Dozen

Gauge No.	16	18	20	22	24	26	28	30	32	34	36
1 oz. Spool	$ 1.55	$ 1.60	$ 1.65	$ 1.95	$ 2.10	$ 2.20	$ 2.65	$ 3.15	$ 4.50	$ 5.25	$ 6.00
2 oz. "	2.77	2.80	2.90	3.47	3.70	3.87	4.70	5.60	7.20	8.40	9.80
¼ lb. "	4.15	4.20	4.35	5.20	5.55	5.80	7.05	8.40	12.00	15.60	19.20
½ lb. "	7.70	7.80	8.10	9.90	10.40	10.80	13.60	15.90	22.80	29.40	36.60
1 lb. "	14.20	14.40	15.00	17.80	19.20	20.20	24.60	30.00	43.20	55.40	70.20

Aluminum Wire

99% Pure Soft Aluminum—B & S Gauge

List Prices Per Single Spool or Coil

Gauge	8	10	12	14	16	18	20	22	24	26	28	30
50 Ft. Spool	$ 1.88	$ 1.20	$0.78	$0.53	$0.38	$0.34	$0.30	$0.27	$0.25	$0.23	$0.21	$0.19
100 " "	3.57	2.28	1.48	1.00	.72	.64	.57	.51	.47	.43	.40	.36
200 " "	6.77	4.32	2.80	1.90	1.37	1.22	1.08	.97	.90	.83	.76	.68
500 " "	13.10	9.00	5.85	3.98	2.85	2.55	2.25	2.02	1.87	1.73	1.57	1.42

Malin's No. 70 Tencenter Spooled Wire Assortment

(Do not confuse with Malin Regular Spooled Wire sold in various weights.)

Every Spool Plainly Marked with Gauge and Length

Sizes Stocked	Gauge No.				
Plain Annealed	18	20	22	24	26
Tinned "	18	20	22	24	26

Sizes Stocked	Gauge No.				
Soft Copper	18	20	22	24	26
Soft Brass	18	20	22	24	26
Spring Brass	18	20	22	24	26

Sizes Stocked	Gauge No.				
Black Hair Wire	28	30	32	34	36
Tinned Hair Wire	28	30	32	34	36

Length of Wire on Spools is as follows:

Annealed & Tinned No.	18	20	22	24	26
Feet Per Spool	21	33	50	58	73

Brass & Copper No.	18	20	22	24	26
Feet Per Spool	12	24	28	34	35

Hair Wire No.	28	30	32	34	36
Feet Per Spool	82	94	102	114	118

Malin's Music Wire

MUSIC WIRE, as ordinarily made, is designed to work indifferently well for either mechanical purposes or for strings on musical instruments, and in consequence is not perfectly adapted for either. MALIN'S MUSIC WIRE is specially made for mechanical purposes only; has a tensile strength of about one hundred and seventy tons per square inch of section, and is extremely tough, instead of being brittle. No other MUSIC WIRE is so well adapted to the demand of the hardware and supply trade.

STOCKED IN ¼ POUND AND 1 POUND COILS

Number	Diameter	Ft. Per Pound	List Per Lb.	Number	Diameter	Ft. Per Pound	List Per Lb.	Number	Diameter	Ft. Per Pound	List Per Lb.
0000000	.003	39000		14	.033	344	$1.60	34	.094	43	$1.20
000000	.004	23433	Prices	15	.035	305	1.60	35	.098	39	1.20
00000	.005	14997	on	16	.037	274	1.40	36	.102	36	1.20
0000	.006	10415	request.	17	.039	247	1.40	37	.106	34	1.20
000	.007	7652		18	.041	223	1.40	38	.110	32	1.20
00	.008	5858	$12.00	19	.043	203	1.20	39	.114	29	1.20
0	.009	4629	9.00	20	.045	185	1.20	40	.118	27	1.20
1	.010	3749	7.50	21	.047	170	1.20	1/8 "	.125	24	1.20
2	.011	2936	6.00	22	.049	156	1.20	9/64"	.140	20	1.20
3	.012	2604	5.00	23	.051	144	1.20	5/32"	.156	16	1.20
4	.013	2218	4.00	24	.055	124	1.20	11/64"	.172	12	1.20
5	.014	1913	3.50	25	.059	108	1.20	3/16"	.187	10	1.20
6	.016	1465	3.00	26	.063	94	1.20	13/64"	.203	9	1.20
7	.018	1157	2.75	27	.067	83	1.20	7/32"	.218	8	1.20
8	.020	937	2.50	28	.071	74	1.20	15/64"	.234	6¾	1.20
9	.022	775	2.25	29	.075	68	1.20	¼ "	.250	5½	1.20
10	.024	651	2.00	30	.080	58	1.20	9/32"	.281	4¾	1.20
11	.026	560	1.80	31	.083	54	1.20	5/16"	.3125	4	1.20
12	.029	447	1.80	32	.086	51	1.20	3/8 "	.375	2⅔	1.20
13	.031	391	1.60	33	.091	46	1.20				

Stainless Steel Wire

Random weight Coils.

PAGE ALLEGHENY METAL (18-8)

Stocked both Spring Temper and Annealed in sizes as indicated below.

Diameter	Wght. Lbs. Per Foot	No. Feet Per Lb.	Temper
.016	.00067	1480	Sp.—
.018	.00085	1170	Sp.—
.020	.00105	944	Sp.—
.022	.00128	780	Sp.—
.024	.00152	658	Sp.—
.026	.00178	562	Sp.—
.028	.00207	483	Sp.—
.030	.00238	420	Sp.—
.032	.00270	370	Sp.—
.034	.00305	328	Sp.—
.036	.00342	292	Sp.—
.038	.00381	262	Sp.—
.041	.00448	223	Sp.—A
.051	.00694	144	Sp.—A
.062	.0102	98	Sp.—A
.072	.0139	72	Sp.—
.080	.0172	58	Sp.—
.091	.0217	46	Sp.—
.105	.0285	35	Sp.—

Stainless Steel Trolling Wire

PAGE ALLEGHENY METAL (18-8)

Annealed and Pickled.

Spools about 300 feet each.

Gauge	Diam.	Ft. Per Pound	Price Per Spool
6	.016	1480	$1.05
7	.018	1170	1.15
8	.020	944	1.30
9	.022	780	1.30
10	.024	658	1.65
11	.026	562	1.90
12	.028	483	2.05
13	.030	420	2.25
14	.032	370	2.55

Spray Wire—Metallizing Wire

12 Ga.—.080" **15 Ga.—.057"**

We can supply wire for spray plating purposes in all common metals and alloys such as zinc, tin, copper, brass, lead, cadmium, aluminum, phosphor bronze, nickel silver, or monel. The above gages are usually used, although other gages may be obtained if desired.

This wire is for use with a metallizing gun.

Stainless Steel Fish Leader Wire

PAGE ALLEGHENY METAL (18-8)

Gauge	Diam.	Lbs. Test	Ft. Per Pound	Price Per Doz. 25 Ft. Lgths.	Price Per 1/4 Lb. Coil
2	.011	25	3140	$1.30	$1.50
3	.012	30	2630	1.35	1.38
4	.013	35	2240	1.40	1.28
5	.014	40	1940	1.64	1.19
6	.016	55	1480	1.88	1.00
7	.018	69	1170	1.88	.85
8	.020	85	944	1.92	.78
9	.022	105	780	1.92	.71
10	.024	124	658	2.07	.68
11	.026	146	562	2.07	.68
12	.028	171	483	2.16	.63
13	.030	195	420	2.45	.59
14	.032	220	370	2.74	.58
15	.034	250	328	3.27	.58
16	.036	280	292	3.75	.58
17	.038	310	262	3.75	.58

25 Ft. lengths are packed in separate glassine envelopes, twelve to a carton.

¼-Lb. Coils are bare. If packed in envelopes add 5c net per coil.

Stainless Steel Tiller Rope

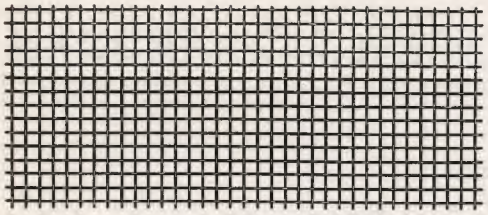
PAGE ALLEGHENY METAL (18-8)

6 Strand x 42 Wire		6 Strand x 19 Wire	
Diameter	Price Per 1,000 Ft.	Diameter	Price Per 1,000 Ft.
3/16"	$260.00	1/8 "	$170.00
7/32"	310.00	5/32"	200.00
¼ "	340.00	3/16"	220.00
9/32"	380.00		
5/16"	400.00		

Strength Comparison—Breaking Test: ⅛" Dia., 6x19 Stainless Steel, 1,500 Lbs. ¼" Dia., Phosphor Bronze Tiller Rope, 1,680 Lbs.

Phosphor Bronze Tiller Rope

Diam.	Breaking Test—Lbs.	Price Per 1,000 Ft.	Diam.	Breaking Test—Lbs.	Price Per 1,000 Ft.
6 Strand x 19 Wire			6 Strand x 42 Wire		
1/8 "	660	$110.00	3/8 "	3800	$240.00
3/16"	1360	120.00	7/16"	4750	280.00
6 Strand x 42 Wire			½ "	6900	340.00
¼ "	1680	200.00	5/8 "	10360	470.00
5/16"	2600	210.00	¾ "	16100	690.00

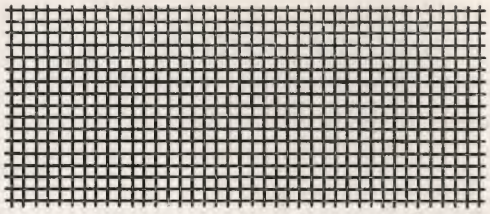


14 Mesh

Screen Cloth

(Fly Screen)

Stainless Steel,
Bronze, Copper,
Galvanized



16 Mesh

Bronze Screen Cloth should be used wherever destructive climatic conditions have to be met. It requires neither paint nor lacquer. The exposure to weather merely darkens the metallic sheen, making the screen almost invisible. Supplied in either bright or antique finish.

Stocked in 14 and 16 Mesh

CARRIED IN ROLLS OF 50 AND 100 LINEAL FEET

14 Mesh—Wire Ga. No. 33—.0118

Width Inches	No. Sq. Ft. Per Roll	Wght. Per Roll, Lbs.
18	150	22
20	166⅔	24
22	183⅓	27
24	200	29
26	216⅔	31
28	233⅓	34
30	250	36
32	266⅔	39
34	283⅓	41
36	300	44
38	316⅔	46
40	333⅓	48
42	350	51
44	366⅔	53
46	383⅓	56
48	400	58

16 Mesh—Wire Ga. No. 33—.0118

Width Inches	No. Sq. Ft. Per Roll	Wght. Per Roll, Lbs.
18	150	23
20	166⅔	25
22	183⅓	28
24	200	30
26	216⅔	33
28	233⅓	35
30	250	38
32	266⅔	40
34	283⅓	43
36	300	45
38	316⅔	47
40	333⅓	51
42	350	53
44	366⅔	56
46	383⅓	58
48	400	61

For Copper Tacks, see Page 76.

Galvanized After Weaving Wire Cloth

The process of "after-galvanizing" insures maintenance of a uniform square mesh, firmly solders every joint and makes the cloth both rigid and rust proof.

HEAVY GRADES

Mesh Per In.	W. & M. Ga. No.	Decimal Inch	Mesh Per In.	W. & M. Ga. No.	Decimal Inch
1¼	13	.092	3	16	.063
1	12	.105	3	18	.047
1	13	.092	3	19	.041
1	14	.080	3½	12	.105
⅞	15	.072	4	12	.105
¾	14	.080	4	14	.080
¾	15	.072	4	16	.063
¾	16	.063	4	18	.047
⅝	16	.063	4	20	.035
⅝	17	.054	5	19	.041
2	12	.105	5	21	.032
2	14	.080	6	16	.063
2	16	.063	6	18	.047
2½	18	.047	6	22	.028
3	12	.105	8	20	.035
3	14	.080	8	22	.028
			8	25	.020

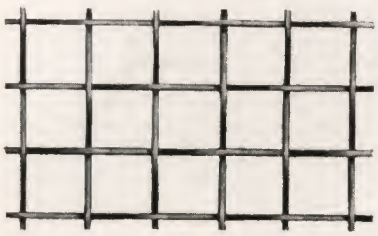
STANDARD OR HARDWARE GRADE

2	19	.041	5	24	.023
2½	20	.035	6	25	.020
3	21	.032	8	27	.017
4	23	.025			

Brass Strainer Cloth

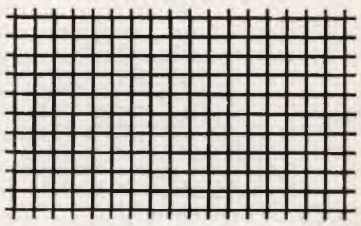
Market Grade—Rolls 12"x60"

Mesh Lin. In.	Wire Size	List Price Per Roll	Mesh Lin. In.	Wire Size	List Price Per Roll
20x20	.010	$1.35	70x49	.0065	$2.30
30x26	.009	1.65	80x55	.00575	2.75
40x32	.0075	1.15	90x63	.005	3.20
50x36	.007	1.35	100x69	.0045	3.65
60x40	.0065	1.50	120x88	.0036	4.50



3 Mesh

Wire Cloth



10 Mesh

Market Grade—Brass, Copper, Phosphor Bronze, Stainless Steel, and Monel
Rolls—36" Wide

Note: Specify Size of Wire in Decimal of an Inch.

Mesh Number to Lineal In.	Diam of Wire Dec. Inch	Approx. Ga. No. W. & M.	Opening Width Inches	Open Area Per Cent	Wght. Lbs. Sq. Ft.	Brass, Copper, Bronze Per Sq. Ft.	Monel, Nickel, Stainless Steel Per Sq. Ft.
*2	.1019	10 B. & S. Gauge 48" Wide Phosphor Bronze.				$2.00	
2	.063	16	.437	76	.53	.65	$1.30
3	.054	17	.279	70	.58	.70	1.40
4	.047	18	.203	66	.62	.70	1.40
5	.041	19	.159	63	.55	.70	1.40
6	.035	20	.132	62	.48	.70	1.40
8	.028	22	.097	60	.40	.65	1.30
10	.025	23	.075	56	.40	.65	1.30
12	.023	24	.060	52	.40	.65	1.30
14	.020	25	.051	51	.40	.65	1.30
16	.018	26	.0445	51	.35	.65	1.30
18	.017	27	.0386	48	.35	.60	1.20
20	.016	28	.034	46	.34	.60	1.20
22	.015	29	.0305	45	.30	.60	1.20
24	.014	30	.0277	44	.30	.60	1.20
30	.013	32	.0203	37	.30	.65	1.30
35	.011	33	.0176	38	.28	.65	1.30
40	.010	34	.0150	36	.30	.70	1.40
45	.0095	35	.0127	33	.28	.85	1.70
50	.009	36	.0110	30	.26	.85	1.70
60	.0075	39	.0092	31	.20	.80	1.60
80	.00575	45	.0068	29	.17	1.25	2.20
100	.0045	50	.0055	30	.15	1.75	2.65

*Special Size

EXTRA FINE MESHES

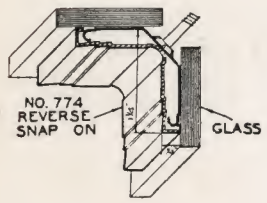
120	.0037	....	.0046	30	....	2.00	3.00
150	.0026	....	.0041	37	....	2.75	4.15
200	.0021	....	.0029	33	....	4.50	6.75
250	.0016	....	.0024	36	....	11.00	16.50
300	.0015	....	.0018	30	....	25.00	37.50

Most of the popular sizes are carried in all four metals. However, before estimating or ordering, it is best to check with our office. This is especially true in extremely large and very small sizes.

For Perforated Metals of all kinds, see Page 22.

Snap-On Architectural Moulding

HIMCO Stainless Laminated Metal (Patented), Polished Finish.

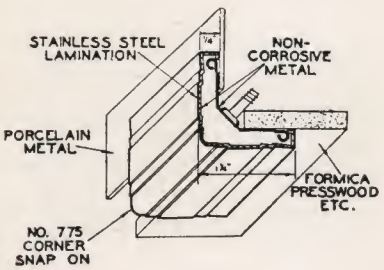


ALLEGHENY METAL

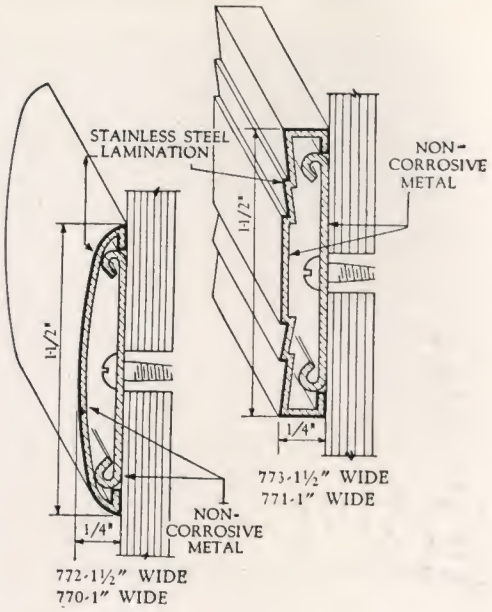
Genuine non-magnetic 18-8 Stainless Steel

ALLEGHENY METAL shell over aluminum alloy core.
No exposed screws.

Stock Length—21 Feet, or supplied cut to length.



	Height	Width	List Per Ft.
Square	**Type—Modernistic**		**Pattern**
No. 771	¼	1	$.65
No. 773	¼	1½	.90
No. 774	¼	2	1.25
No. 775	¼	2½	1.25
Half Oval Type			
No. 668	¼	½	.45
No. 669	¼	¾	.55
No. 770	¼	1	.65
No. 772	¼	1½	.90



Can also be supplied in Polished or Satin Finished Bronze.

Carpet and Linoleum Hardware

Holes Drilled for Screws or Pins
(See cuts of shapes on Page 51)

Nosings

Lengths About 12 Feet

BRASS

Item No.	Width Inch	Lip Inch	For Material Size	Thickness or Gauge	List Price Per Foot
22	1¼	.....	....	18	$ .225
37	1⅞	1	....	18	.39
38	1⅞	1	....	18	.39
121	1¼	.....	....	20	.18
137½	1¼	1	....	20	.27
138	1⅞	1	....	20	.33
138½	1¼	1	....	20	.27
139	1¾	1⅛	....	20	.33
175	1	¾	....	20	.2025
677	1⅛	⅞	⅛	....	1.32
678	1⅛	⅞	3/16	....	1.38

BRONZE

475	1	¾	....	20	.27

WHITE METAL

0677	1⅛	⅞	⅛	....	.57
0678	1⅛	⅞	3/16	....	.57

BRASS PLATED STEEL

121	1¼	....	....	20	.12

Discounts quoted upon application.

DOOR SADDLES

Corrugated Type

Extruded Brass or Aluminum.
Random Lengths—about 14 Ft.
Widths—4", 5", and 6".

DIAMOND TREAD STAIR PLATES

Furnished in all sizes and shapes to special order.

KICK PLATES—PUSH PLATES

Brass, Bronze, Aluminum, or Stainless Steel.

Furnished in all sizes, drilled to specification.
Polished finish, or plated if desired.
Ask for quotation to cover your specifications.

Edgings and Bindings

EDGINGS

Lengths About 12 Feet

BRASS

Item No.	Width Inch	Material Thickness	Drilling	List Price Per Foot
60	½	¼	P or S	$ .48
70	½	¼	P or S	.36
91	1½	Misc.	S	1.20
93	7/16	3/16	P or S	.48
255	¾	Misc.	S	.33
672	¾	⅛	S	.54
673	1⅛	⅛	S	.66
683	1¼	3/16	S	.72

WHITE METAL

Satin Finish or Polished

070	½	¼	P or S	.36
0672	¾	⅛	S	.24
0673	1⅛	⅛	S	.27

"P"—Drilled for Pins.
"S"—Drilled for Screws.

BINDINGS

Furnished with Pins

BRASS

Item No.	Width Inch	Gauge No.	Feet Per Box	List Price Per Box
67	¾	30	150	$ 4.80
102	1	22	75	7.80
102½	1	26	75	6.45
103	1	22	75	9.75
104	1¼	22	75	10.95
104½	1¼	26	75	7.55
106	¾	18	75	13.50
111	⅝	22	75	6.45
111½	⅝	26	75	4.80
114	2	22	75	16.50
117	¾	22	75	6.45
117½	¾	26	75	4.80
153	¾	20	75	9.00

ZINC

111	⅝	22	75	3.75
117	¾	22	75	3.75

BRONZE

411	⅝	22	75	9.00
417	¾	22	75	9.00

Discounts quoted on application.

Shapes of Carpet and Linoleum Hardware

Nosings

No. 22

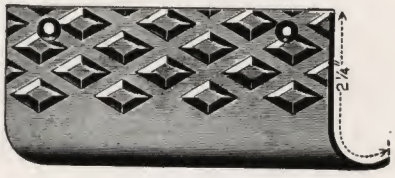
No. 37

Nos. 38, 138

Nos. 677, 678, 0677, 0678

No. 121

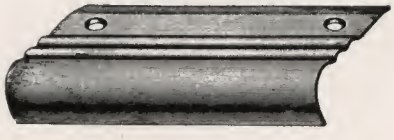
Nosings



No. 137½

No. 138½

No. 139



Nos. 175, 475

Escutcheon Pins	See page 77
Copper Tacks	See page 76
Brass Wood Screws	See page 57
Steel Wood Screws	See page 57

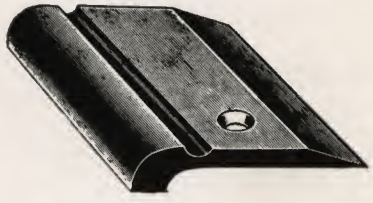
OTHER EXTRUDED SHAPES

Angle Brass	See page 11
Half Round Brass	See page 11
Half Oval Brass	See page 11

Edgings

No. 60

No. 70



Nos. 573, 673, 0573, 0673

No. 91

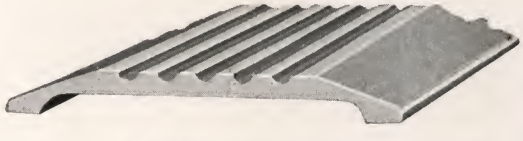
Bindings

No. 67

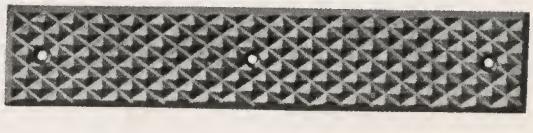
Nos. 102, 104, 104½, 114, 117, 117½, 317, 417

Nos. 103, 106, 111, 153, 311, 411

Door Saddles (Threshold)



Stair Plates



For sizes and materials carried in stock, See opposite page. Additional shapes and sizes supplied on special order.

BAKELITE

Table of Properties

Bakelite Laminated (All Types)

The data below are generally indicative of the properties of Bakelite Laminated, including stock made with the several bases—paper, linen, and canvas—and with varying degrees of resinoid impregnation. The figures given under "minimum" and "maximum" do not represent a range in test data for a given sample, but are rather the extremes noted in extensive test data covering a wide range of samples.

Bakelite Laminated

(Comparison of Paper Base and Fabric Base Type)

The figures in each vertical column are understood to apply only to one particular kind of laminated material. Several dozen kinds of Bakelite Laminated, varying in type of base and in per cent of resinoid impregnation, are manufactured. Rather than list complete data for all varieties of the material, the following condensed typical figures are presented. While these data are typical, it is well to remember that other materials differing in any one or several of the properties are available, or can be specially produced.

Physical Properties	All Types Minimum	All Types Maximum	Specific Types Paper base	Specific Types Fabric base
Specific gravity	1.32	1.41	1.36	1.38
Oil absorption	Nil	Nil	Nil	Nil
Water absorption (24 hours immersion) (water absorption varies, depending upon size, shape, etc. of sample)	.2%	3.0%	.5%	.9%
Resistance to heat (safe limit for constant temperature)	90°C. 194°F.	150°C. 300°F.	125°C. 257°F.	110°C. 230°F.
Hardness (sample flatwise)				
Brinell	30	40	40	38
Scleroscope	70	94	80	72
Coefficient of expansion (sample lengthwise) (per degree centigrade)	.00002	.00003	.00002	.00002
Tensile strength (ultimate) (pounds per square inch)	8,500	24,000	19,000	10,000
Modulus of elasticity (from tensile test) (pounds per square inch)	1,000,000	2,500,000	1,500,000	1,000,000
Bending test				
Ultimate strength (pounds per square inch)				
Sample flatwise	15,000	30,000	21,000	20,000
Sample edgewise	15,000	24,000	20,000	20,000
Compression test				
Ultimate strength (pounds per square inch)				
Sample flatwise	30,000	43,000	30,000	40,000
Sample edgewise	18,000	35,000	18,000	22,000
Shearing test				
Ultimate strength (pounds per square inch)				
Sample flatwise	7,000	11,500	10,000	9,000
Sample edgewise	8,000	10,000	10,000	9,000
Dielectric strength (volts per mil thickness)				
1/8-inch sample	400	900	900	450
1/32-inch sample	400	1,400	1,400	1,000
Dielectric constant	4.5	6	4.5	5.5
Power factor (at radio frequencies)	1.5	10	3.5%	8%
Volume resistivity (ohms per centimeter cube)	10^{10}	10^{13}	10^{12}	10^{10}

Below are listed the stock sizes available.

Round Rods

1/4	7/8	2
5/16	1	2 1/4
3/8	1 1/8	2 1/2
7/16	1 1/4	2 3/4
1/2	1 3/8	3
9/16	1 1/2	3 1/4
5/8	1 5/8	3 1/2
11/16	1 3/4	3 3/4
3/4	1 7/8	4

Round Tubes

Wall Thicknesses 1/32, 1/16, 3/32, 1/8, 3/16, 1/4

Inside Diameter

3/16	9/16	15/16	1 5/16	1 11/16
1/4	5/8	1	1 3/8	1 3/4
5/16	11/16	1 1/16	1 7/16	1 13/16
3/8	3/4	1 1/8	1 1/2	1 7/8
7/16	13/16	1 3/16	1 9/16	1 15/16
1/2	7/8	1 1/4	1 5/8	2

Sheets

Standard Size 36"x42"

Thickness Inches	Wt. Per Sq. Ft.	Thickness Inches	Wt. Per Sq. Ft.
1/16	.450	1/2	3.47
1/8	.870	5/8	4.50
3/16	1.319	3/4	5.40
1/4	1.800	1	7.20
3/8	2.635		

FIBRE Colors—Red, Grey, or Black

Round Rods

Hard Vulcanized Fibre

Lengths Approximately 5 Feet

3/32	5/8	1 1/2
1/8	11/16	1 5/8
3/16	3/4	1 3/4
1/4	13/16	1 7/8
5/16	7/8	2
3/8	15/16	2 1/8
7/16	1	2 1/4
1/2	1 1/8	2 3/8
9/16	1 1/4	2 1/2
	1 3/8	

Round Hard Fibre Tubes

Lengths from 2 to 3 Feet

Wall Thicknesses 1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 5/16

Inside Diameter

1/8	5/8	1 1/4	2 1/8	3 1/8
3/16	11/16	1 3/8	2 1/4	3 1/4
1/4	3/4	1 1/2	2 3/8	3 3/8
5/16	13/16	1 5/8	2 1/2	3 1/2
3/8	7/8	1 3/4	2 5/8	3 5/8
7/16	15/16	1 7/8	2 3/4	3 3/4
1/2	1	2	2 7/8	3 7/8
9/16	1 1/8		3	4

Vulcanized Fibre Sheets

Size about 46"x72"

Thickness Inches	Wt. Per Sq. Ft.	Thickness Inches	Wt. Per Sq. Ft.	Thickness Inches	Wt. Per Sq. Ft.
1/64	.112	3/8	2.70	1 1/8	8.10
1/32	.225	7/16	3.15	1 1/4	9.00
3/64	.337	1/2	3.60	1 3/8	9.90
1/16	.45	5/8	4.50	1 1/2	10.80
1/8	.90	3/4	5.40	1 5/8	11.70
3/16	1.35	7/8	6.30	1 3/4	12.60
1/4	1.80	1	7.20	1 7/8	13.50
5/16	2.25			2	14.40

Solid Balls

Diameter Inch	Decimal Inch	No. Per Package	Net Weight Per Package	Brass, Bronze Monel Metal Stainless Steel List Per M	Chrome Steel List Per M
1/16	.0625	10,000	.40	$ 12.00	
3/32	.09375	10,000	1.28	12.00	
1/8	.125	10,000	3.1	8.00	$ 6.00
5/32	.1562	5,000	3.0	9.00	7.00
3/16	.1875	5,000	5.1	11.00	8.00
7/32	.2187	5,000	8.1	13.00	9.00
1/4	.2500	2,000	4.8	15.00	10.00
9/32	.2812	2,000	6.8	19.00	12.00
5/16	.3125	1,000	4.7	25.00	14.00
11/32	.3437	1,000	6.2	30.00	16.00
3/8	.3750	1,000	8.0	34.00	18.00
7/16	.4375	500	6.5	60.00	28.00
1/2	.5000	500	9.5	88.00	35.50
9/16	.5625	500	13.4	126.00	60.00
5/8	.6250	250	9.3	172.00	73.00
11/16	.6875	200	10.0	212.00	100.00
3/4	.7500	200	12.6	252.00	128.00
13/16	.8125	150	12.4	336.00	155.00
7/8	.8750	125	12.7	372.00	188.00
15/16	.9375	100	12.6	440.00	230.00
1	1.0000	75	11.5	512.00	270.00
1 1/16	1.0625	65	11.9	610.00	325.00
1 1/8	1.1250	50	10.9	700.00	373.00
1 3/16	1.1875	45	11.6	900.00	460.00
1 1/4	1.2500	40	11.9	1100.00	500.00
1 5/16	1.3125	30	10.4	1300.00	620.00
1 3/8	1.3750	25	10.1	1600.00	740.00
1 7/16	1.4375	25	11.4	1750.00	820.00
1 1/2	1.5000	20	10.3	1900.00	1050.00
1 9/16	1.5626	20	11.11	2050.00	.....
1 5/8	1.625	20	12.96	2200.00	.....
1 11/16	1.6875	15	10.76	2400.00	.....
1 3/4	1.75	15	12.20	2600.00	.....
1 13/16	1.8125	15	13.28	3100.00	.....
1 7/8	1.875	10	10.08	3500.00	.....
1 15/16	1.9375	10	10.89	3950.00	.....
2	2.000	10	12.27	4400.00	.....
2 1/8	2.125	5	7.32	4700.00	.....
2 1/4	2.250	5	8.72	6000.00	.....
2 3/8	2.375	5	10.31	7000.00	.....
2 1/2	2.500	5	12.02	8000.00	.....

The above estimated weights are for Brass or Bronze.
Multiply the above weights by 1.04 for Monel Metal.
.926 for Stainless Steel.
.918 for Chrome Steel.

METALBESTOS

"AIR INSULATED"

Gas Vent Pipe and Fittings

The products of combustion of all natural and artificial gases contain varying amounts of sulfuric acid or sulfurous acid which condense as these exhaust gases cool, usually in the vent pipe itself, causing corrosion or deterioration of the pipe. METALBESTOS is made with a pure aluminum inner pipe, which is unaffected by these acids, a heavily galvanized outer pipe, with a half inch of circulating air space between the two for insulation. This construction insures corrosion free service and a rapid flow of gases through the pipe due to the absence of rapid cooling.

METALBESTOS is DURABLE, EFFICIENT, SAFE and EASY TO INSTALL.

METALBESTOS ROUND PIPE AND FITTINGS

Sizes		3"	4"	5"	6"	7"	8"	10"
Pipe*	Per Ft.	$ .36	$ .51	$ .66	$ .79	$ .93	$1.09	$1.45
Angles—45°	Each	1.10	1.25	1.40	1.55	1.95	2.45	4.10
" -90°	"	1.25	1.40	1.55	1.80	2.25	2.85	4.50
Tees	"	1.65	1.95	2.25	2.70	3.20	3.90	4.25
Tee Drip Caps	"	.20	.25	.30	.35	.45	.55	.65
Reducers‡	"	.....	1.10	1.35	1.55	1.85	2.25	3.00
Ventilator Tops	"	1.50	1.85	2.25	2.60	3.35	4.10	5.25
Master "A" Tops	"	1.25	1.50	1.80	2.15	2.75	3.30	4.10
Standard "A" Tops	"	1.50	1.85	2.25	2.60	3.35	4.10	5.25
Connectors	Set	.25	.30	.35	.40	.50	.60	.75
Ventilated Wall Thimbles	Each	1.00	1.25	1.50	1.75	2.25	2.75	3.50
Wall Brackets	"	.35	.40	.45	.50	.55	.60	.70
Extra Spacers	"	.06	.08	.10	.12	.15	.18	.24

*Round and Rectangular Pipe furnished in either 3′ or 10′ lengths at prices listed. Sizes always refer to Inner Aluminum pipe.

‡Prices of reducers are for sizes listed to any smaller diameter.

§Tees furnished with round side outlets of corresponding area to rectangular vertical section. Smaller outlets furnished if desired at same prices.

¶Adapters are made from rectangular to round to correspond to dimensions at head of columns.

METAL GAUGES ARE AS FOLLOWS:

ALUMINUM	—3" TO 6"	INCLUSIVE—	28 GAUGE
"	—7" TO 8"	"	—26 "
"	—OVER 8"	"	—24 "
GALVANIZED STEEL	—4" TO 7"	INCLUSIVE—	26 "
" "	—OVER 7"	"	—24 "

METALBESTOS RECTANGULAR PIPE AND FITTINGS

Rectangular Sizes		2¼"x3¼"	2¼"x5¾"	2¼"x9"	2½"x11½"
Equivalent Round Sizes		3"	4"	5"	6"
Pipe*	Per Ft.	$ .50	$ .70	$ .88	$1.05
Flat Angles—45°	Each	1.85	2.25	2.60	3.00
" " —90°	"	2.25	2.60	3.00	3.35
Side Angles—45°	"	1.50	1.85	2.25	2.60
" " —90°	"	1.85	2.25	2.60	3.00
Tees§	"	2.25	2.60	3.00	3.35
Tee Drip Caps	"	.45	.50	.55	.60
Adapters¶	"	1.85	2.25	2.60	3.00
Wall Brackets	"	.40	.45	.50	.55
Extra Spacers	"	.10	.12	.15	.18

APPROXIMATE SHIPPING WEIGHTS—CRATED

(Deduct 20% for Weight Uncrated)

Pipe—Per 100 feet

Fittings—Per Dozen

ROUND PIPE AND FITTINGS

Size	3"	4"	5"	6"	7"	8"	10"
Pipe	145	180	220	260	310	370	480
45° Elbows	19	24	30	38	49	60	80
90° Elbows—Tops, Reducers	24	32	40	50	62	74	110
Tees	35	48	60	75	95	118	165

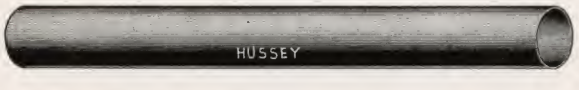
RECTANGULAR PIPE AND FITTINGS

Size	2¼"x3¼"	2¼"x5¾"	2¼"x9"	2½"x11½"
Pipe	190	230	275	325
Elbows (All Angles)	30	40	50	75
Tees and Adapters	40	50	60	90

Ask for illustrated folder giving further information and complete installation instructions.
Discounts Quoted upon Application.

Copper Leaders or Down Spouts

16 OZ. ROUND PLAIN—10 FOOT LENGTHS



16 OZ. ROUND CORRUGATED—10 FOOT LENGTHS

SQUARE, PLAIN AND CORRUGATED—10 FOOT LENGTHS

This shape by long custom has been termed Square. Whereas, in reality, it is Rectangular in shape. We state sizes by trade terms and also actual dimensions.

ROUND, PLAIN AND CORRUGATED

16 oz.—10 Foot Lengths

Size		2"	2½"	3"	4"	5"	6"
List Per Foot	Plain	$ .30	$ .36	$ .36	$ .51	$ .69	$ .90
	Corrugated	.30	....	.36	.51	.69	.90

Discount Quoted upon Application.

SQUARE CORRUGATED

Size	2"	3"	4"	5"
Actual Dimensions.....	1¾x2¼	2⅜x3¼	2¾x4¼	3¾x5
List Per Foot.....	$ .31	$ .40	$ .53	$ .75

Discount Quoted upon Application.

SQUARE PLAIN

Actual Dimensions...	1¾x2¼	1¾x2¾	2x3	2x4	3x4	4x4
List Per Foot.....	$ .32	$ .36	$ .41	$ .45	$ .63	$ .67

Discount Quoted upon Application.

Copper Gutter or Eaves Trough

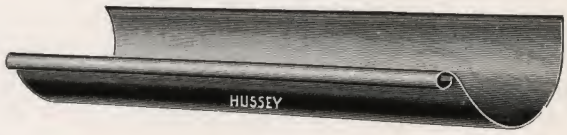
Single or Double Bead—Lap or Slip Joint

Single Bead Slip Joint must be specified right or left hand.

Double Bead Slip Joint is reversible for either hand.

16 oz. Copper—10 Foot Lengths

250 Feet per crate



List Prices per Lineal Foot

Size Inch	LAP JOINT Single Bead	LAP JOINT Double Bead	SLIP JOINT Single Bead	SLIP JOINT Double Bead
3	$ .26	$ .32	$ .29	$ .35
4	.32	.40	.35	.43
5	.36	.45	.39	.48
6	.44	.55	.47	.58
7	.54	.64	.57	.67
8	.63	.75	.66	.78
9	.80	.92	.83	.95
10	.95	1.07	.98	1.10

Discount quoted upon Application.

Copper Elbows and Shoes

16 oz.—Round Plain and Corrugated—Square Corrugated

Elbows are furnished in different degrees of angle. Use number when ordering to designate type wanted. Also specify whether elbows or shoes are desired when ordering.

Angle Number	1	2	3	4
Degrees	45°	60°	75°	90°

Size	PLAIN ROUND Elbows	PLAIN ROUND Shoes	CORRUGATED ROUND Elbows	CORRUGATED ROUND Shoes	CORRUGATED SQUARE Elbows	CORRUGATED SQUARE Shoes
2″	$ .75 ea.	$ .85 ea.	$ .75 ea.	$ .85 ea.	$ .90 ea.	$1.05 ea.
3″	1.00	1.10	1.00	1.10	1.20	1.35
4″	1.50	1.65	1.50	1.65	1.80	2.00
5″	2.25	2.50	2.25	2.50	2.75	3.00
6″	3.15	3.50	3.15	3.50	.....	.....

Discount quoted upon Application.

Copper Adjustable Elbows

16 oz.—Adjustable to any angle

Size	3″	4″	5″	6″
List Each	$ .63	$ .94	$1.50	$1.75

Discount quoted upon Application.

Copper Vent Pipe Accessories

Copper Vent Elbows

Short and Standard

	List Each
3″	$1.00
4″	1.50
5″	2.25
6″	3.15

Copper Vent Drip Tees

	Each Net
3″	$1.35
4″	1.65
5″	2.10
6″	2.75

Copper A Tops

Standard	Master
3″	3″
4″	4″
5″	5″
6″	6″
	7″
	8″

Plain Copper Vent Tees

3″	$1.00
4″	1.35
5″	1.75
6″	1.95

End Piece Complete

Copper Gutter Accessories

Size	END PIECES With Cap & Outlet Single Bead	Double Bead	END PIECES With Outlet—No Cap Single Bead	Double Bead
	List Per Dozen			
3″	$16.20	$19.20	$11.40	$14.40
4″	17.40	20.40	12.60	15.60
5″	19.20	22.20	13.20	16.20
6″	22.20	25.20	15.60	18.60
7″	27.00	30.00	19.20	22.20

Discount quoted upon Application.

OUTLETS Size	Outlets	CAPS Caps
	List Price Each	
2″	$.30	$.30
3″	.40	.40
4″	.45	.45
5″	.70	.70
6″	.80	.80

OUTSIDE CORNER

Copper Mitres—16 oz.

INSIDE CORNER

Double seamed—Reinforced. For Standard Gutter

Single Bead or Double Bead—Outside or Inside

Lap or Slip Joint—Accurate Angle

In single bead the slip determines the hand. The bead side being toward you. In measuring a job take the entire length and add one foot for each mitre. When ordering, don't fail to state whether Inside or Outside, and if slip joint state rights or lefts, otherwise half rights and half lefts will be supplied.

List Price Per Dozen

Size	LAP JOINT Single Bead	Double Bead	SLIP JOINT Single Bead	Double Bead
3″	$10.80	$13.80	$13.80	$16.80
4″	11.40	14.40	14.40	17.40
5″	13.20	16.20	16.20	19.20
6″	20.04	23.04	23.04	26.04
7″	25.80	28.80	28.80	31.80

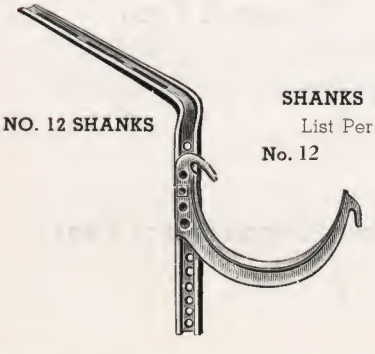
Copper Wire Strainers

List Price Per Dozen

ROUND			SQUARE		
2″	#17 Gauge	$1.80	2″x3″	#17 Gauge	$4.00
3″	17	2.90	3″x4″	16	8.00
4″	16	4.20	4″x5″	15	10.00
5″	15	7.20			
6″	15	8.25			

Discount quoted upon Application.

Copper Gutter Hangers



NO. 12 SHANKS

SHANKS ONLY
List Per 100
No. 12 $19.00

GEM CIRCLES
For Single Bead Gutter

PENN CIRCLES
For Double Bead Gutter

List Per 100—Including brass bolts and clips

4 Inch	$18.50	4 Inch	$25.00
5 Inch	20.00	5 Inch	28.00
6 Inch	31.00	6 Inch	35.00

Brass Wood Screws
Silicon Bronze Wood Screws

List Price Per Gross

¼ Inch No.		⅜ Inch No.		½ Inch No.		⅝ Inch No.		¾ Inch No.		⅞ Inch No.		1 Inch No.		1¼ Inch No.	
0	$.64	0	$.66	1	$.78	2	$.90	2	$1.00	4	$1.40	4	$1.50	6	$2.20
1	.66	1	.70	2	.84	3	1.00	3	1.10	5	1.55	5	1.65	7	2.50
2	.70	2	.76	3	.90	4	1.10	4	1.20	6	1.75	6	1.85	8	2.80
3	.76	3	.82	4	.98	5	1.25	5	1.35	7	2.00	7	2.15	9	3.20
4	.86	4	.90	5	1.10	6	1.40	6	1.50	8	2.25	8	2.40	10	3.60
		5	.98	6	1.25	7	1.60	7	1.75	9	2.50	9	2.70	11	4.00
		6	1.10	7	1.45	8	1.80	8	2.00	10	2.75	10	3.00	12	4.45
				8	1.65	9	2.05	9	2.25	11	3.10	11	3.35	14	5.75
						10	2.30	10	2.50	12	3.45	12	3.80		
								11	2.75			14	4.90		
								12	3.10						

1½ Inch No.		1¾ Inch No.		2 Inch No.		2¼ Inch No.		2½ Inch No.		3 Inch No.		3½ Inch No.	
6	$2.45	8	$3.65	8	$4.00	10	$5.60	10	$6.20	12	$9.15	12	$11.20
7	2.80	9	4.10	9	4.50	11	6.35	11	7.00	14	11.20	14	13.25
8	3.20	10	4.60	10	5.10	12	7.15	12	7.80	16	14.40	16	16.65
9	3.60	11	5.20	11	5.75	14	9.00	14	9.85	18	17.65	18	20.20
10	4.00	12	5.85	12	6.55	16	11.35	16	12.50				
11	4.55	14	7.40	14	8.15	18	13.60	18	15.10				
12	5.10			16	10.30								
14	6.50			18	12.45								

Iron Wood Screws

List Price Per Gross

¼ Inch No.		⅜ Inch No.		½ Inch No.		⅝ Inch No.		¾ Inch No.		⅞ Inch No.		1 Inch No.		1¼ Inch No.		1½ Inch No.		1¾ Inch No.	
0	$.30	0	$.32	1	$.34	2	$.36	2	$.38	3	$.44	3	$.46	4	$.52	4	$.60	6	$.72
1	.30	1	.32	2	.34	3	.38	3	.40	4	.46	4	.48	5	.54	5	.62	7	.78
2	.30	2	.32	3	.36	4	.38	4	.40	5	.48	5	.50	6	.58	6	.66	8	.84
3	.32	3	.34	4	.36	5	.40	5	.42	6	.52	6	.54	7	.62	7	.70	9	.90
4	.32	4	.34	5	.36	6	.44	6	.46	7	.56	7	.58	8	.66	8	.75	10	.96
		5	.34	6	.40	7	.48	7	.50	8	.60	8	.62	9	.70	9	.80	11	1.05
		6	.38	7	.44	8	.52	8	.54	9	.64	9	.66	10	.76	10	.86	12	1.15
		7	.42	8	.48	9	.56	9	.58	10	.68	10	.70	11	.84	11	.95	14	1.50
		8	.46	9	.52	10	.60	10	.62	11	.72	11	.75	12	.92	12	1.05	16	1.90
				10	.56	11	.64	11	.66	12	.76	12	.80	14	1.25	14	1.35	18	2.30
						12	.68	12	.70	14	1.05	14	1.10	16	1.55	16	1.70	20	2.70
								14	.90			16	1.40	18	1.85	18	2.05		
																20	2.40		

2 Inch No.		2¼ Inch No.		2½ Inch No.		2 ¾ Inch No.		3 Inch No.		3½ Inch No.		4 Inch No.		4½ Inch No.		5 Inch No.	
6	$.78	6	$.82	6	$.90	8	$1.10	8	$1.20	10	$1.90	12	$2.50	14	$3.30	14	$3.65
7	.84	7	.88	7	.96	9	1.20	9	1.30	11	2.10	14	3.00	16	3.85	16	4.20
8	.90	8	.95	8	1.05	10	1.32	10	1.42	12	2.30	16	3.55	18	4.50	18	5.00
9	1.00	9	1.05	9	1.15	11	1.45	11	1.55	14	2.80	18	4.20	20	5.25	20	6.00
10	1.10	10	1.15	10	1.25	12	1.65	12	1.75	16	3.35	20	4.95	24	7.10	24	7.60
11	1.20	11	1.25	11	1.35	14	2.05	14	2.25	18	3.95	24	6.60				
12	1.30	12	1.35	12	1.50	16	2.60	16	2.80	20	4.55						
14	1.60	14	1.75	14	1.85	18	3.20	18	3.40	24	5.70						
16	2.00	16	2.20	16	2.40	20	3.80	20	4.00								
18	2.40	18	2.65	18	3.00			24	4.95								
20	2.80	20	3.10	20	3.60												

Lengths and diameters not listed are special, but are furnished to the extent that they may be in stock, or when required in sufficient quantities of a size to warrant being made to order. Such non-listed lengths and diameters take the list prices of the next longer or larger listed sizes.

Flat head and oval head countersunk wood screws are measured from outer edge of countersink to point. Round heads from beneath head.

FINISHING WASHERS—REFER TO PAGE 75.

LEAD SCREW ANCHORS—REFER TO PAGE 69.

Holtite Thread-Forming Screws

HOLTITE
(Reg. U.S. Patent Office)

Round Head

Countersunk Flat Head

PRICE PER GROSS

Diameters Lengths	No. 4	No. 6	No. 7	No. 8	No. 10	No. 12	No. 14
¼"	$.24	$.25					
⅜	.25	.26	$.27	$.29	$.34		
½	.26	.27	.28	.31	.36	$.38	$.39
⅝	.27	.28	.29	.33	.38	.40	.42
¾	.28	.29	.30	.35	.40	.42	.45
⅞	....	.30	.31	.37	.42	.44	.48
1	....	.31	.32	.39	.44	.46	.51
1¼	....	....	....	.43	.48	.50	.57
1½	....	....	....	.47	.52	.54	.63
1¾	....	....	....	....	.56	....	.69
2	....	....	....	....	.60	....	.75

Stocked in Round Head Plain Steel only. Others available from factory.

Holtite Thread-Forming Screws

Binding Head

Countersunk Oval Head

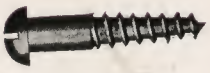
PRICE PER 1000

Diameters Lengths	No. 4	No. 6	No. 7	No. 8	No. 10	No. 12	No. 14
¼	$1.68	$1.75					
⅜	1.75	1.82	$1.89	$2.03	$2.38		
½	1.82	1.89	1.96	2.17	2.52	$2.66	$2.73
⅝	1.89	1.96	2.03	2.31	2.66	2.80	2.94
¾	1.96	2.03	2.10	2.45	2.80	2.94	3.15
⅞	....	2.10	2.17	2.59	2.94	3.08	3.36
1	....	2.17	2.24	2.73	3.08	3.22	3.57
1¼	....	....	....	3.01	3.36	3.50	3.99
1½	....	....	....	3.29	3.64	3.78	4.41
1¾	....	....	....	....	3.92	....	4.83
2	....	....	....	....	4.20	....	5.25

Duralumin Wood Screws—Bright Finish

Temper designation 17ST

Showing stock sizes



ROUND HEAD

Length	Size 4	6	8	10
½	*	*		
⅝	*	*	*	
¾	*	*	*	*
⅞		*	*	
1		*	*	*
1¼			*	*
1½				*

OVAL HEAD

Length	Size 4	6	8	10
½	*			
⅝	*	*	*	
¾		*	*	*
⅞		*	*	
1		*	*	*
1¼			*	*
1½				*

FLAT HEAD

Length	Size 4	6	8	10
½	*			
⅝	*	*		
¾		*	*	*
⅞		*		
1		*	*	*
1¼				*
1½		*	*	*
2			*	*

Flat Head

Stainless Steel Wood Screws

18—8 Chromium-Nickel

ALLEGHENY METAL

Flat Countersunk Head

Price Per Gross

Round Head

Oval Csk. Head

Gauge Decimal	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 12	No. 14	No. 16	No. 18
Diameter Inches	.1236	.1368	.150	.163	.1763	.1894	.2158	.242	.2684	.2947
Length										
½	$ 3.25	$ 3.40								
⅝	3.45	3.70	$ 4.05	$ 4.15						
¾	3.70	4.05	4.30	4.40	$ 4.70	$ 5.00	$ 7.27			
1	.....	4.80	5.20	5.30	5.65	6.00	8.90	$ 9.10		
1¼	.....	5.05	5.70	5.82	6.10	7.00	10.20	11.25	$11.75	$15.80
1½	.....	5.55	6.10	6.20	6.55	8.10	11.10	12.50	14.20	17.10
1¾	.....	5.95	6.85	7.00	7.45	9.20	12.50	14.10	15.20	18.60
2	.....	.....	.....	8.10	8.70	10.30	14.00	15.30	16.60	19.80
2¼	.....	.....	.....	9.20	9.90	11.45	15.10	17.30	17.80	22.00
2½	.....	.....	.....	10.00	10.85	12.60	16.75	18.55	18.70	24.00
3	.....	.....	.....	.....	.....	.....	.....	22.00	24.60	27.00

Upset head, cut thread, bright tumbled finish.

For Round or Oval Head add 5% to above List Prices.

Round Head

Oval Csk. or French Head

Stainless Steel Machine Screws

18—8 Chromium-Nickel

ALLEGHENY METAL

Flat Head

Price Per Gross

Flat Head

Fillister Head

Truss Head

Diameter	6	8	10	10	1/4	5/16	3/8
Threads Per Inch	32	32	24	32	20	18	16
Length							
¼	$2.20	$2.20					
⅜	2.20	2.30	$2.70	$2.80	$4.40		
½	2.30	2.40	2.80	2.90	4.55	$ 7.50	$ 8.95
⅝	2.35	2.45	2.95	3.05	4.95	7.75	9.45
¾	2.40	2.60	3.10	3.20	5.45	8.40	9.95
1	2.60	3.00	3.80	3.90	5.95	9.50	11.90
1¼	3.40	3.80	4.20	4.30	6.55	10.80	13.80
1½	4.20	4.60	4.70	4.80	7.20	12.10	15.20
2	.....	5.80	6.20	6.40	9.30	14.05	18.30

Supplied with upset head, rolled thread, bright tumbled finish.

To obtain List Prices for
Oval or Round Head Screws—Add 5% to above List Prices.
Fillister Head Screws— Add 10% to above List Prices.
Truss Head Screws— Add 20% to above List Prices.

Stainless Steel Taper Pins

18—8 Chromium-Nickel

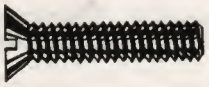
Taper ¼" to the Foot

ALLEGHENY METAL

Price Per 100

Diameter Large End	.0715	.092	.108	.125	.147	.156	.172	.193	.219	.250	.289
Fractional Size	5/64	3/32	7/64	1/8	9/64	5/32	11/64	3/16	7/32	1/4	19/64
Number	6/0	5/0	4/0	3/0	2/0	0	1	2	3	4	5
Length											
½	$7.80	$7.86	$7.92								
⅝	7.90	7.96	8.02	$ 8.08							
¾	8.00	8.06	8.12	8.18	$ 8.24	$ 8.30	$ 8.64	$ 9.04	$ 9.98	$10.32	$11.36
⅞	8.26	8.33	8.40	8.47	8.51	8.61	8.98	9.41	10.33	10.76	11.89
1	8.54	8.60	8.68	8.76	8.84	8.92	9.32	9.78	10.68	11.20	12.42
1¼	.....	.....	9.35	9.44	9.53	9.62	10.00	10.58	11.50	12.14	13.52
1½	.....	.....	.....	10.31	10.40	10.50	10.70	11.38	12.38	13.06	14.72
1¾	.....	.....	.....	.....	11.08	11.20	11.42	12.10	13.38	13.98	15.78
2	.....	.....	.....	.....	.....	.....	12.14	12.86	14.18	14.88	16.94
2¼	.....	.....	.....	.....	.....	.....	.....	13.70	15.00	15.78	18.24
2½	.....	.....	.....	.....	.....	.....	.....	.....	15.82	16.70	19.54
2¾	.....	.....	.....	.....	.....	.....	.....	.....	16.64	17.68	20.90
3	.....	.....	.....	.....	.....	.....	.....	.....	17.88	18.60	22.20

For other Stainless Steel Material see Index, Page 8.

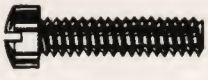


Brass Machine Screws

Flat, Round, Oval and Fillister Head

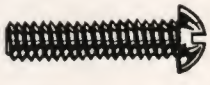
List Price per Gross

Diameter	2	3	4	6	8	10	12	1/4"	5/16"	3/8"
Common	56	48	40	32	32	24	24	20	18	16
Less Common	64	56	48	40	36	32	28	28	24	24
Length										
1/8 "	$ .28	$ .34	$ .40	$ .52						
3/16"	.30	.36	.42	.54	$.70	$.95				
1/4 "	.32	.38	.44	.58	.76	1.05	$1.60			
5/16"	.34	.40	.46	.62	.82	1.15	1.70	$2.30		
3/8 "	.36	.42	.48	.66	.88	1.25	1.80	2.40	$4.60	
7/16"	.38	.44	.50	.70	.94	1.35	1.90	2.50	4.80	
1/2 "	.40	.46	.54	.76	1.02	1.45	2.00	2.65	5.00	$7.10
5/8 "	.44	.52	.62	.92	1.20	1.75	2.20	2.95	5.40	7.70
3/4 "	.50	.58	.68	1.00	1.30	1.90	2.40	3.15	5.80	8.20
7/8 "	.56	.66	.74	1.10	1.45	2.05	2.60	3.45	6.30	8.90
1"	.....	.....	.82	1.20	1.60	2.20	2.80	3.75	6.80	9.60
1 1/8 "	.....	.....	.90	1.30	1.75	2.35	3.00	4.05	7.30	10.30
1 1/4 "	.....	.....	1.00	1.45	1.90	2.55	3.25	4.35	7.80	11.00
1 1/2 "	.....	.....	1.25	1.65	2.15	2.90	3.75	4.95	8.50	12.10
1 3/4 "	.....	.....	.....	1.95	2.45	3.35	4.25	5.55	9.30	13.40
2	.....	.....	.....	2.25	2.75	3.80	4.75	6.15	10.40	14.70
2 1/4 "	.....	.....	.....	.....	3.10	4.25	5.25	6.75	11.50	16.20
2 1/2 "	.....	.....	.....	.....	3.45	4.75	5.75	7.35	12.60	17.80
2 3/4 "	.....	.....	.....	.....	3.80	5.25	6.25	8.00	13.70	19.50
3"	.....	.....	.....	.....	4.15	5.75	6.75	8.65	14.90	21.60



Iron Machine Screws

Flat, Round, Oval and Fillister Head



List Price per Gross

Diameter	2	3	4	6	8	10	12	1/4"	5/16"	3/8"
Common	56	48	40	32	32	24	24	20	18	16
Less Common	64	56	48	40	36	32	28	28	24	24
Length										
1/8 "	$ .24	$ .25	$ .26	$ .28						
3/16"	.25	.26	.27	.29	$ .35	$ .45				
1/4 "	.26	.27	.28	.30	.36	.46	$ .64			
5/16"	.27	.28	.29	.31	.37	.48	.66	$ .80		
3/8 "	.28	.29	.30	.32	.39	.50	.68	.84	$1.55	
7/16"	.29	.30	.31	.34	.41	.52	.70	.88	1.60	
1/2 "	.30	.31	.32	.36	.43	.54	.74	.92	1.65	$2.20
5/8 "	.32	.33	.34	.40	.47	.58	.82	1.00	1.75	2.40
3/4 "	.33	.34	.36	.43	.49	.62	.86	1.05	1.80	2.50
7/8 "	.34	.36	.38	.46	.53	.66	.92	1.10	1.90	2.65
1"	.....	.....	.42	.50	.57	.70	.98	1.20	2.00	2.85
1 1/8 "	.....	.....	.46	.54	.63	.76	1.04	1.30	2.10	3.05
1 1/4 "	.....	.....	.52	.58	.69	.82	1.10	1.40	2.25	3.25
1 1/2 "	.....	.....	.60	.68	.82	.95	1.24	1.60	2.45	3.55
1 3/4 "	.....	.....	.....	.82	.95	1.12	1.40	1.80	2.75	3.95
2"	.....	.....	.....	.96	1.08	1.30	1.60	2.00	3.05	4.40
2 1/4 "	.....	.....	.....	.....	1.25	1.50	1.80	2.25	3.35	4.85
2 1/2 "	.....	.....	.....	.....	1.45	1.70	2.05	2.50	3.65	5.40
2 3/4 "	.....	.....	.....	.....	1.65	1.95	2.30	2.75	4.00	6.00
3"	.....	.....	.....	.....	1.85	2.15	2.60	3.10	4.40	6.60

Length of Flat Head Screws measured over all. All others measured under head.

Lengths, diameters and threads per inch not listed are special; but are furnished to the extent that they may be in stock or when required in sufficient quantities of a size to warrant being made to order. When ordering, state length first.

The coarse threads are those recommended by the National Screw Thread Commission as being more commonly used and we intend to carry large stocks of coarse threads.

NOTE: Cannot supply 1/8" length in Flat and Oval Heads.

MACHINE SCREW NUTS—REFER TO PAGE 70.

LEAD SCREW ANCHORS—REFER TO PAGE 69.

Silicon Bronze Machine Screws

Round Head Flat Head

List Price Per Gross

Diameter / Threads Per Inch / Length	No. 6 32	No. 8 32	No. 10 24	1/4 20	5/16 18	3/8 16
1/4	$1.30	$1.80				
3/8	1.38	1.90	$2.20	$4.40		
1/2	1.46	2.00	2.35	4.65	$ 8.40	$11.00
5/8	1.54	2.10	2.50	4.90	8.80	11.60
3/4	1.62	2.20	2.65	5.15	9.20	12.20
7/8	1.70	2.30	2.80	5.40	9.60	12.80
1	1.78	2.40	2.95	5.65	10.00	13.40
1 1/4	.....	2.60	3.25	6.15	10.80	14.60
1 1/2	.....	2.80	3.55	6.65	11.60	15.80
1 3/4	.....	.....	.....	7.15	12.40	17.00
2	.....	.....	.....	7.65	13.20	18.20

Silicon Bronze Cap Screws and Machine Bolts

Nuts Are Not Included

List Price Per Hundred

Diameter / Threads Per Inch / Length	1/4 20	5/16 18	3/8 16	1/2 13	5/8 11	3/4 10
3/4	$12.50	$14.50	$16.25	$17.90		
1	12.50	14.50	16.25	19.00	$26.10	$39.00
1 1/4	12.50	14.50	16.25	20.20	28.50	43.80
1 1/2	12.50	14.50	16.65	21.90	31.00	48.90
1 3/4	12.75	14.90	17.05	22.50	33.60	54.00
2	13.00	15.30	17.45	23.10	36.40	59.20
2 1/4	13.25	15.70	17.85	23.70	39.40	64.40
2 1/2	13.50	16.10	18.25	24.30	42.70	69.60
2 3/4	13.75	16.50	18.65	24.90	46.30	74.70
3	14.00	16.90	19.05	25.50	50.30	79.80
3 1/4	14.25	17.30	19.45	26.10	.....	.....
3 1/2	14.50	17.70	19.85	26.70	.....	.....
3 3/4	14.75	18.10	20.25	27.30	.....	.....
4	15.00	18.50	20.65	27.90	.....	.....

Sizes longer than listed—Prices upon application.

Duralumin Machine Screws

Temper Designation 17ST

Showing Stock Sizes

ROUND HEAD—Bright Finish

Length Inches	Diameter and Thread 6-32	8-32	10-24	10-32	1/4-20
1/4	*	*		*	
5/16	*	*	*	*	
3/8	*	*		*	*
7/16	*	*		*	*
1/2	*	*		*	*
5/8	*	*	*		*
3/4	*	*	*	*	*
7/8	*	*		*	*
1	*	*		*	*
1 1/4	*	*	*	*	*
1 1/2	*	*	*		*
1 3/4	*	*	*		*
2	*	*	*		*
2 1/2					*

FILLISTER HEAD

3/8		*			
1/2			*		
3/4	*	*			
1				*	
1 1/4		*			

JACKSON HEAD

3/8			*		
1/2			*		

FLAT HEAD

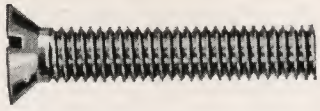
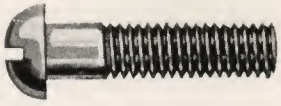
Length Inches	Diameter and Thread 6-32	8-32	10-24	10-32	1/4-20
1/4	*	*	*		
5/16	*	*	*		
3/8	*	*	*	*	*
7/16	*	*		*	*
1/2	*	*		*	*
5/8	*	*		*	*
3/4	*	*		*	*
7/8	*	*	*		*
1	*	*		*	*
1 1/4	*	*		*	*
1 1/2	*	*	*		*
1 3/4	*	*	*		*
2	*	*	*		*

OVAL HEAD

1/4	*	*			
5/16	*	*			
3/8	*	*		*	
7/16	*				
1/2	*	*	*	*	*
9/16	*				
5/8	*	*	*	*	
3/4	*	*		*	*
7/8		*	*		
1	*	*		*	
1 1/4		*	*	*	*
1 1/2				*	
1 3/4		*			
2			*	*	

Brass Cap Screws

HEXAGON, FLAT, ROUND AND FILLISTER HEAD

U. S. Standard

List Price Per Hundred, Subject to Discount

MILLED FROM BAR STOCK

Diameter of Screw	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Threads Per Inch	20	18	16	14	13	11	10
Length							
½	$4.70	$6.70	$.....	$.....	$.....	$.....	$.....
⅝	4.90	6.90	8.80	.....	.....	.....	.....
¾	5.10	7.10	9.10	12.10	17.90	.....	.....
⅞	5.30	7.30	9.40	.....	.....	.....	.....
1	5.50	7.60	9.80	13.10	19.00	26.10	39.00
1¼	6.00	8.20	10.60	14.20	20.20	28.50	43.80
1½	6.50	8.90	11.50	15.40	21.50	31.00	48.90
1¾	7.10	9.70	12.50	16.70	22.90	33.60	54.00
2	7.80	10.80	13.60	18.10	24.40	36.40	59.20
2¼	8.70	11.80	14.80	19.60	26.00	39.40	64.40
2½	9.80	12.90	16.10	21.20	27.70	42.70	69.60
2¾	11.00	14.20	17.50	23.00	29.60	46.30	74.70
3	12.00	15.40	19.00	25.00	31.70	50.30	79.80
Diameter of Head (Hex.)	7/16	1/2	9/16	5/8	3/4	7/8	1
Height of Head (Hex.)	3/16	15/64	9/32	21/64	3/8	15/32	9/16

Our brass cap screws are all milled from the bar with cut threads. They are made to close limits and machined to an excellent finish. Sizes and lengths other than listed and special types of heads, threads, etc., can be economically produced to your specifications.

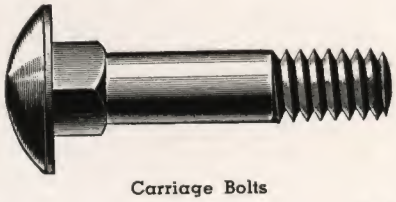
For lengths longer than 3 inches, see page 66.

Stainless Steel

18-8 Chromium-Nickel

ALLEGHENY METAL

Price Per 100 Pieces Without Nuts



Hexagon or Square Head Machine Bolts

Carriage Bolts

Diameter of Screw	1/4	5/16	3/8	1/2	5/8	3/4
Threads Per Inch	20	18	16	13	11	10
Length						
½	$11.60	$15.35	$.....	$.....	$.....	$.....
⅝	11.95	15.60	18.05	.....	.....	.....
¾	12.35	16.10	18.35	.....	.....	.....
1	13.13	16.75	18.95	27.10	37.08	49.50
1¼	13.94	17.35	19.60	28.21	38.90	54.20
1½	14.80	18.00	20.24	29.36	40.37	58.30
2	16.47	19.31	21.54	31.64	43.62	63.60
2½	18.13	20.58	22.83	34.00	46.91	68.00
3	19.88	21.87	24.12	36.32	50.26	73.20
3½	.....	.....	25.40	38.65	53.60	77.75
4	.....	.....	26.66	41.00	56.95	81.36
4½	.....	.....	.....	43.31	60.33	86.44
5	.....	.....	.....	45.65	63.65	91.45
6	.....	.....	.....	50.32	70.40	101.52

Stainless Steel Set Screws

18-8 Chromium-Nickel

ALLEGHENY METAL

Cup Point—Round Point

Square Head **Slotted Head**

Prices Per 100

Diameter of Screw Threads	1/4	5/16	3/8	7/16	1/2	5/8
Per Inch	20	18	16	14	13	11
Length Under Head						
½	$14.38	$15.34	$15.54	$.....	$.....	$.....
⅝	14.68	15.86	16.18	16.30	.....	.....
¾	14.98	16.34	16.84	17.04	19.28	.....
1	15.58	17.34	18.34	18.52	21.26	23.90
1¼	.....	.....	19.10	20.00	23.28	26.68
1½	.....	.....	.....	.....	25.28	29.20

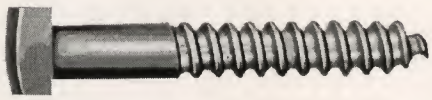
For other Stainless Steel Material, see Index, Page 8.

Stainless Steel Lag Screws

18-8 Chromium-Nickel

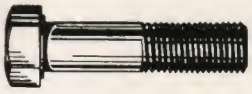
ALLEGHENY METAL

Square Head—Gimlet Point



Size	Price Per 100
¼x1½	$14.80
¼x2	16.47
⅜x2	21.54
⅜x2½	22.83
⅜x2¾	23.47
⅜x3	24.12
⅜x3½	25.40

Steel Cap Screws



HEXAGON HEAD

American Standard

Carried in stock in the fractional sizes of the Coarse and Fine Thread Series.

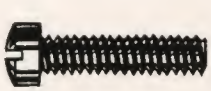
List of August 1, 1936

Price per Hundred

Outside Diam. Screw Lgth. Under Head to Extreme Point	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
	Packed 100 in a box						50 in a box		25 in a box	20 in a box
1/2	$1.30	$1.50	$1.90							
5/8	1.35	1.60	2.00							
3/4	1.40	1.70	2.10	$3.00	$4.70					
7/8	1.50	1.80	2.20	3.10	4.90					
1	1.60	1.90	2.30	3.20	5.10	$ 7.90	$ 8.60			
1 1/4	1.80	2.10	2.50	3.50	5.50	8.40	9.20	$13.30		
1 1/2	2.00	2.30	2.70	3.80	5.90	8.90	9.80	14.10		
1 3/4	2.20	2.50	3.00	4.10	6.30	9.40	10.40	14.90		
2	2.40	2.70	3.30	4.50	6.70	10.00	11.00	15.70	$24.60	$36.00
2 1/4	2.60	2.90	3.60	4.90	7.20	10.60	11.60	16.50	25.80	38.00
2 1/2	2.80	3.20	3.90	5.30	7.70	11.20	12.20	17.30	27.20	40.00
2 3/4	3.00	3.50	4.30	5.70	8.20	11.80	12.80	18.10	28.60	42.00
3	3.30	3.80	4.70	6.20	8.70	12.40	13.50	18.90	30.00	44.00
3 1/4	4.00	4.60	5.30	6.70	9.20	13.00	14.20	19.80	31.50	46.00
3 1/2	4.70	5.40	5.90	7.20	9.80	13.60	15.00	20.80	33.00	49.00
3 3/4	.....	.....	6.80	7.90	10.40	14.30	15.80	21.80	35.00	52.00
4	.....	.....	7.70	8.60	11.00	15.00	16.60	22.80	37.00	55.00
4 1/2	.....	.....	.....	.....	13.40	17.50	18.60	25.50	41.00	61.00
5	.....	.....	.....	.....	.....	.....	22.60	30.90	45.00	68.00
5 1/2	.....	.....	.....	.....	.....	.....	.....	.....	54.00	80.00
6	.....	.....	.....	.....	.....	.....	.....	.....	63.00	92.00
Add for each 1/4 Inch	.70	.80	.90	1.00	1.20	1.50	2.00	2.70	4.50	6.00

10 in a box

Steel Cap Screws



Round (Button), Flat (Countersunk), Fillister, and Flat Fillister Head

List Prices Per Hundred

Lgth. of Screw	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
	Outside Diameter of Screw									
	Packed 100 in a Box.					50 in a Box.			25 in a Box.	
3/4	$2.70	$3.00	$3.75	$ 4.90	$ 6.10					
1	3.05	3.35	4.15	5.30	6.50	$ 9.80				
1 1/4	3.35	3.55	4.45	5.65	6.85	10.15	$10.50			
1 1/2	3.65	3.80	4.80	6.05	7.35	10.50	10.85	$15.95		
1 3/4	3.80	4.10	5.20	6.50	7.80	11.15	11.50	16.35	$25.70	
2	4.00	4.35	5.60	6.90	8.30	11.80	12.15	16.75	26.20	$33.60
2 1/4	4.15	4.65	6.00	7.50	9.00	12.60	13.00	17.80	27.60	35.75
2 1/2	4.35	4.95	6.40	8.05	9.75	13.50	13.90	18.80	29.10	38.00
2 3/4	4.55	5.25	6.80	8.60	10.50	14.25	14.65	19.80	30.60	40.20
3	4.70	5.55	7.20	9.15	11.20	15.00	15.40	20.90	32.15	42.40
3 1/4	.....	5.85	7.60	9.75	12.05	15.70	16.10	22.10	34.10	45.00
3 1/2	.....	.....	8.00	10.35	12.80	16.45	16.85	23.15	36.95	47.80
3 3/4	.....	.....	.....	10.95	13.60	17.15	17.50	24.40	37.90	50.40
4	.....	.....	.....	.....	14.40	17.85	18.35	25.60	39.80	53.20
4 1/4	.....	.....	.....	.....	.....	18.60	19.00	26.30	41.50	55.75
4 1/2	.....	.....	.....	.....	.....	.....	19.75	27.00	43.15	58.60
4 3/4	.....	.....	.....	.....	.....	.....	.....	27.80	44.80	61.20
5	.....	.....	.....	.....	.....	.....	.....	.....	46.50	63.90

Prices of screws not listed and extras for case hardening, annealing, bluing, galvanizing, nickeling and other finishes will be furnished on application.

DISCOUNTS WILL BE QUOTED UPON REQUEST.

Iron Stove Bolts

Round Head—Flat Head
With Square Nuts

List Price per 100

Diameter of Bolt Length In.	1/8	5/32	3/16	1/4	5/16	3/8	1/2
3/8	$0.57	$0.57	$0.67				
1/2	.60	.60	.70	$1.12			
5/8	.63	.63	.63	1.18			
3/4	.66	.66	.76	1.25	$2.12	$2.90	
7/8	.68	.68	.79	1.31	2.20	3.00	
1	.71	.71	.83	1.38	2.27	3.10	$ 8.80
1 1/8	.76	.76	.86	1.44	2.34	3.20	9.00
1 1/4	.80	.80	.90	1.51	2.41	3.30	9.20
1 3/8	.84	.84	.96	1.57	2.50	3.40	9.40
1 1/2	.89	.89	1.01	1.64	2.59	3.50	9.60
1 3/4	1.00	1.00	1.12	1.80	2.77	3.75	10.00
2	1.11	1.11	1.27	1.98	3.00	4.00	10.50
2 1/4	.....	.....	1.41	2.16	3.20	4.25	11.10
2 1/2	.....	.....	1.59	2.34	3.45	4.55	11.70
2 3/4	.....	.....	1.77	2.55	3.70	4.80	12.30
3	.....	.....	1.95	2.75	3.95	5.20	13.00
3 1/2	.....	.....	2.25	3.10	4.40	5.80	14.40
4	.....	.....	2.55	3.45	4.85	6.40	15.80
4 1/2	.....	.....	2.85	3.80	5.30	7.00	.....
5	.....	.....	3.15	4.15	5.75	7.60	.....
5 1/2	.....	.....	3.45	4.50	6.20	8.20	.....
6	.....	.....	3.75	4.85	6.65	8.80	.....
Add to List for Nickel Plating.....	.80	.80	.90	1.20	1.50	2.00	.....
Less Nuts Deduct From List....	.10	.10	.12	.20	.35	.50	.80
With Hexagon Nuts Add to List....	.05	.05	.07	.10	.20	.30	.50

Nuts Only—List Price Per Gross

Thread	40	32	24	20	18	16	
Square	.20	.24	.26	.44	.76	1.04	.....
Hexagon	.25	.28	.30	.50	.94	1.18	.....

Brass Stove Bolt Prices quoted on application.

Knurled Brass Screws

List Price Per Hundred

Size of Thread	Diameter of Head	Lengths 1/2 In.	3/4 In.	1 In.
6-32	3/8	$1.75	$2.10	$2.50
8-32	13/32	2.00	2.40	2.90
10-24	7/16	2.40	2.80	3.30
12-24	1/2	3.00	3.50	4.10
1/4-20	9/16	3.50	4.20	5.00

Sizes other than listed furnished promptly from factory.

Holder Screws

Price Per 100

Length	6-32	8-32
1/2"	$0.49	$0.61
5/8	.55	.68
3/4	.61	.75
7/8	.67	.82
1	.73	.89

Steel accessories, including cap screws, cotters, wood screws, machine screws, nuts, stove bolts, etc., are our specialty. See index for listing elsewhere in this catalogue.

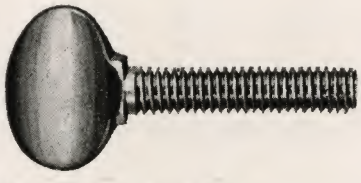
Brass Set Screws

List Price Per Hundred

Diameter of Screw	1/4	5/16	3/8	1/2	5/8
Threads Per Inch	20	18	16	13	11
Length					
½	$ 8.00	$ 9.00	$11.25	.....	.....
¾	9.00	10.00	12.50	$13.75	.....
1	10.00	11.00	13.75	15.00	.....
1¼	11.00	12.00	15.00	16.25	$17.50
1½	12.00	13.00	16.25	17.50	21.25
1¾	13.00	14.00	17.50	18.75	23.75
2	14.00	15.00	18.75	20.00	26.25
2½	.....	.....	21.75	23.00	31.25
3	.....	.....	24.75	26.00	36.25

Stock sizes of set screws are all square head, cup point. They can be economically produced in any other type of point such as cone point, dog point, round point or headless if required. Furnished promptly in other metals such as monel metal, bronze, etc. Prices quoted on application.

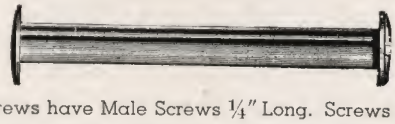
Brass Thumb Screws



Style No. 1

Threads Per In.	24	20	18	16	14	13
Diam. In. or Ga. No.	10	1/4	5/16	3/8	7/16	1/2
Length Inch						
¼	$ 6.50	.....	.....	.....	.....	.....
⅜	6.75	$ 9.50	.....	.....	.....	.....
½	6.75	9.50	$11.25	$15.00	$20.50	.....
⅝	7.25	10.00	12.00	16.50	.....	.....
¾	7.25	10.00	12.50	16.50	21.25	$35.00
⅞	.....	10.50	.....	.....	.....	.....
1	8.25	11.25	14.50	18.00	23.75	37.50
1¼	9.50	12.50	17.00	20.50	27.50	40.00
1½	10.75	13.75	19.00	23.00	31.25	42.50
1¾	.....	.....	.....	26.25	.....	45.00
2	13.25	16.25	21.50	28.75	40.00	47.50

Chicago Binding Screws



Made of Brass—Will Not Rust

Heads 7/16" Diam. Body 3/16" Diam. ¼" Screws have Male Screws ¼" Long. Screws ⅜" and Longer have Male Screws ⅜" Long. Full Expansion Screws Have Male Screw Same Length as Female Screw.

Length Carried in Stock	List Price Per 100 Plain Brass	List Price Per 100 Nickel Plated	Length Carried in Stock	List Price Per 100 Plain Brass	List Price Per 100 Nickel Plated
¼"	$3.20	$4.20	1½"	$ 6.40	$ 7.40
⅜"	3.80	4.80	1¾"	6.80	7.80
½"	4.20	5.20	2"	9.00	10.00
⅝"	4.80	5.80	2½"	10.00	11.00
¾"	5.20	6.20	3"	11.00	12.00
1"	5.60	6.60	3½"	12.75	13.75
1¼"	6.00	7.00	4"	15.00	16.00

Length (Carried in Stock)	List Price Per 100 Plain Brass	List Price Per 100 Nickel Plated
½"	$ 6.50	$ 7.50
⅝"	7.50	8.50
¾"	8.50	9.50
1"	9.50	10.50
1¼"	10.50	11.50

Silicon Bronze—the new metal that has superior corrosion resistant qualities as well as a very high tensil strength. Ask us about Silicon Bronze. See Index for listing.

Bronze Machine Bolts

Hexagon Head With Hex Brass Nuts

LIST PRICE PER HUNDRED

Length Under Head	Diameter of Bolts 1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
2	$13.00	$15.30	$17.45	$20.50	$23.10	$33.80	$ 49.00	$ 75.00	$109.00
2¼	13.25	15.70	17.85	21.00	23.70	34.80	.....	.....	.....
2½	13.50	16.10	18.25	21.50	24.30	35.80	51.85	79.00	114.10
2¾	13.75	16.50	18.65	22.00	24.90	36.80	.....	.....	.....
3	14.00	16.90	19.05	22.50	25.50	37.80	54.70	83.00	119.20
3¼	14.25	17.30	19.45	23.00	26.10	38.80	.....	.....	.....
3½	14.50	17.70	19.85	23.50	26.70	39.80	57.55	87.00	124.30
3¾	14.75	18.10	20.25	24.00	27.30	40.80	.....	.....	.....
4	15.00	18.50	20.65	24.50	27.90	41.80	60.40	91.00	130.00
4½	15.50	19.30	21.45	25.50	29.10	43.80	63.25	95.00	136.00
5	16.00	20.10	22.25	26.50	30.30	45.80	66.10	99.00	142.00
5½	16.50	20.90	23.05	27.50	31.50	47.80	68.95	103.00	148.00
6	17.00	21.70	23.85	28.50	32.70	49.80	71.80	107.00	154.00
7	18.00	23.30	25.45	30.50	35.10	53.80	77.50	115.00	166.00
8	19.00	24.90	27.05	32.50	37.50	57.80	83.20	123.00	178.00
9	20.00	26.50	28.65	34.50	39.90	61.80	88.90	131.00	190.00
10	21.00	28.10	30.25	36.50	42.30	65.80	94.60	139.00	202.00
11	22.00	29.70	31.85	38.50	44.70	69.80	100.30	147.00	214.00
12	23.00	31.30	33.45	40.50	47.10	73.80	106.00	155.00	226.00

Our machine bolts are manufactured by the hot forged process. This method does not strain or crystallize the metal. Square heads can be furnished instead of hexagon, if necessary but are considered special and not carried in stock.

Lengths up to and including 12 inches carried in stock. Longer lengths furnished promptly to order.

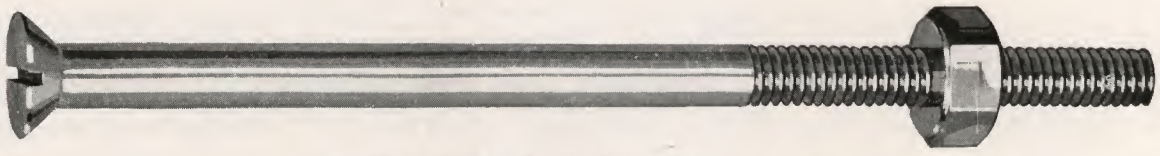
Bronze Carriage Bolts

With Hexagon Brass Nuts

LIST PRICE PER HUNDRED

Length Under Head	Diameter of Bolts 1/4	5/16	3/8	7/16	1/2	5/8
1½	$12.00	$14.50	$16.00	$20.00		
2	12.50	15.30	16.80	21.00	$23.00	
2½	13.00	16.10	17.60	22.00	24.30	$42.50
3	13.50	16.90	18.40	23.00	25.60	44.50
3½	14.00	17.20	19.20	24.00	26.90	46.50
4	14.50	18.00	20.00	25.00	28.20	48.50
4½	15.00	18.80	21.80	26.00	29.50	50.50
5	15.50	19.60	22.60	27.00	30.80	52.50
5½	16.00	20.40	23.40	28.00	32.10	54.50
6	16.50	21.20	24.20	29.00	33.40	56.50
7	18.00	23.20	26.20	31.50	36.40	61.50
8	19.50	25.20	28.20	34.00	39.40	66.50
9	21.00	27.20	30.20	36.50	42.40	71.50
10	22.50	29.20	32.20	39.00	45.40	76.50
11	24.00	31.20	34.20	41.50	48.40	81.50
12	25.50	33.20	36.20	44.00	51.40	86.50

Our Bronze carriage bolts are manufactured by the hot forged process. They are well made and desirable for many uses. Lengths up to and including 12 inches carried in stock. Longer lengths furnished promptly to order.



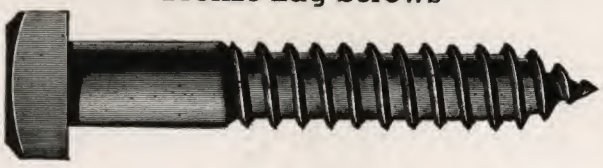
Extra Length Flat Head Brass Bolts

Full Size Shank—Cut Thread

LIST PRICE PER HUNDRED

Diameter of Bolt	Length of Bolt 3½"	4"	4½"	5"	5½"	6"	7"	8"	10"
¼ "	$17.60	$18.40	$19.40	$20.40	$21.30	$22.20	$24.20	$26.10	$28.00
5/16"	23.00	24.60	26.20	27.80	29.40	31.00	34.20	38.40	44.60
⅜ "	20.00	31.00	33.00	35.00	37.00	39.00	43.00	47.00	51.00
½ "	39.00	42.00	45.00	47.50	52.00	55.00	60.00	66.00	71.00

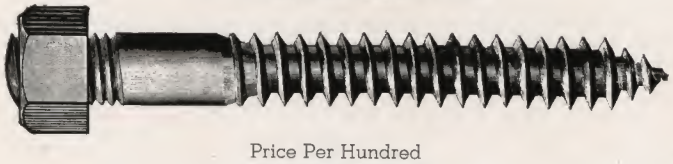
Bronze Lag Screws



List Price Per Hundred

Length Under Head	Diameter of Screw 1/4	5/16	3/8	7/16	1/2	5/8	3/4
1½	$11.00	$12.00	$12.90	.....	.....	.....	.....
2	11.50	12.50	13.25	$16.20	$17.75	$26.00	$38.50
2½	12.00	13.15	14.20	17.05	18.85	28.00	40.75
3	12.50	13.80	15.00	17.90	20.00	30.00	43.00
3½	13.00	14.45	15.80	18.75	21.20	32.00	45.85
4	13.50	15.10	16.60	19.60	22.40	34.00	48.70
4½	14.00	15.75	17.40	20.50	23.60	36.00	51.55
5	14.50	16.40	18.20	21.50	24.80	38.00	54.40
5½	15.00	17.05	19.00	22.50	26.10	40.00	57.25
6	15.50	17.70	19.80	23.50	27.40	42.00	60.10
7	16.50	19.00	21.40	25.50	30.00	46.00	65.85
8	17.50	20.30	23.00	27.50	32.60	50.00	71.55
9	18.50	21.60	24.60	29.50	35.20	54.00	77.25
10	19.50	22.90	26.20	31.50	37.80	58.00	82.95
11	20.50	24.20	27.80	33.50	40.40	62.00	88.65
12	21.50	25.50	29.40	35.50	43.00	66.00	94.35

Bronze Hanger Bolts
WITH HEXAGON BRASS NUTS



Price Per Hundred

Length Over All Inches	Diameter of Screw 3/8"	7/16"	1/2"	5/8"	3/4"
3	$17.00	$20.00	$23.20	$32.00	$44.00
3½	17.80	21.00	24.40	34.00	46.85
4	18.60	22.00	25.60	36.00	49.70
5	20.20	24.00	28.00	40.00	56.40
6	21.80	26.00	30.40	44.00	62.20
7	23.40	28.00	32.80	48.00	67.70
8	25.00	30.00	35.20	52.00	73.40
9	26.60	32.00	37.60	56.00	79.10
10	28.20	34.00	40.00	60.00	84.80
11	29.80	36.00	42.40	64.00	90.50
12	31.40	38.00	44.80	68.00	96.20

Brass Stud Bolts—Without Nuts

List Price Per Hundred

Diameter Length	3/8	1/2	5/8	3/4	7/8	1
1½	$ 8.00	$ 9.75	$13.75	.....	.....	.....
2	8.80	11.25	16.25	.....	.....	.....
2½	9.60	12.75	18.75	$29.10	.....	.....
3	10.40	14.25	21.25	31.90	$35.00	$42.50
3½	11.20	15.75	23.75	34.70	39.00	47.50
4	12.00	17.25	26.25	37.50	43.00	52.50
5	14.00	20.75	31.75	43.50	53.00	62.50
6	16.00	24.25	37.25	49.50	63.00	72.50

Threaded Brass Rod

List Prices Per Hundred Feet Stock Lengths

Thread	Length	List	Thread	Length	List
6-32	1 foot	$15.00	14-20	2 foot	$30.00
8-32	2 foot	16.50	14-24	2 foot	30.00
10-32	2 foot	21.00	¼-28	2 foot	30.00
10-24	2 foot	21.00	¼-20	2 foot	30.00
12-24	2 foot	25.50	5/16-18	2 foot	54.00

All our threaded brass rod is cut thread. We have developed a special process which enables us to give a very fine and accurate product. It is superior to the rolled threading process and our facilities permit us to give very low prices and very long lengths of continuous threads.

Can be furnished in any diameter or length up to ½ inch by 12 feet long.

Prices on cut thread copper and bronze rod furnished on application.

Paine Spring Type Toggle Bolts

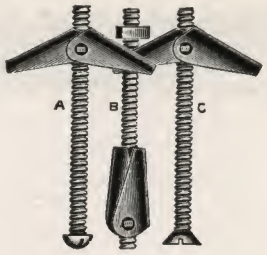


Fig. 123

Paine Toggles work instantly in any position in any hollow material. The only toggle that will work in Gypsum or Malachite. Made in six sizes of bolts; eight different styles of heads. Bolts made any length and threaded to the head except those longer than 6 inches. The regular stock toggle is made of steel.

LIST PRICES OF PAINE TOGGLES COMPLETE

Diam. Bolt Length	Size of Hole	Spread of Wings	Wt. per 100	Price per 100 all Steel	Price per 100 all Brass	Price per 100 Brass Bolt Steel Toggle
6-32x2	3/8	1 5/16	1¼	$6.50	$16.00	$11.25
6-32x3	3/8	1 5/16	1½	6.75	16.65	11.70
6-32x4	3/8	1 5/16	1⅞	7.00	17.30	12.15
1/8 x3	7/16	1 7/16	2¼	6.75	16.65	11.70
1/8 x3½	7/16	1 7/16	2½	6.90	17.05	12.00
1/8 x4	7/16	1 7/16	2¾	7.00	17.30	12.15
3/16x2	½	1 15/16	3¼	6.60	16.30	11.45
3/16x3	½	1 15/16	3¾	6.85	16.95	11.90
3/16x3½	½	1 15/16	4	7.00	17.30	12.15
3/16x4	½	1 15/16	4½	7.15	17.70	12.45
3/16x5	½	1 15/16	5⅛	7.50	18.55	13.00
3/16x6	½	1 15/16	5¾	7.80	19.30	13.55
¼ x3	19/32	2	6	7.85	19.40	13.65
¼ x3½	19/32	2	6½	8.00	19.85	13.95
¼ x4	19/32	2	7	8.15	20.15	14.15
¼ x5	19/32	2	8¼	8.55	21.20	14.85
¼ x6	19/32	2	9¼	8.95	22.15	15.55
5/16x3	13/16	2 3/8	10	9.85	24.25	17.05
5/16x4	13/16	2 3/8	11½	10.15	25.00	17.60
5/16x5	13/16	2 3/8	13½	10.55	25.95	18.25
5/16x6	13/16	2 3/8	15½	10.95	26.95	18.95
3/8 x3	7/8	2 3/4	12½	11.50		
3/8 x4	7/8	2 3/4	15	13.50		
3/8 x5	7/8	2 3/4	17½	15.00		
3/8 x6	7/8	2 3/4	20	16.50		
½ x4	1 1/8	3 ½	30	20.00		
½ x6	1 1/8	3 ½	39	23.00		

Prices on Application

For size of Drill see column under heading "Size of Hole." All Bolts are of Standard Machine Screw Thread.

Paine Spring Type Riveted-on-Head Toggle

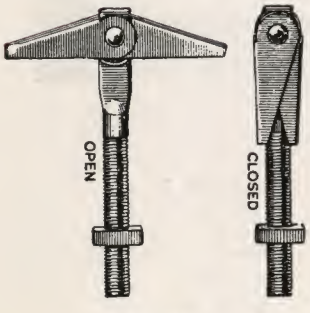
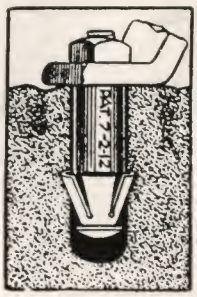


Fig. 125

Diam. Bolt Length	Size of Hole	Spread of Wings	Wt. per 100	Price per 100
5/16x3	5/8	2¼	10	$ 9.85
5/16x4	5/8	2¼	11½	10.15
5/16x5	5/8	2¼	13½	10.55
5/16x6	5/8	2¼	15½	10.95
3/8 x3	5/8	2¼	12½	11.50
3/8 x4	5/8	2¼	15	13.50
3/8 x5	5/8	2¼	17½	15.25
3/8 x6	5/8	2¼	20	16.50

The Riveted-on-Head Toggle is intended for heavy duty in such materials as tile, steel ceilings, metal lath, etc.



Type No. 1—Used with Carriage Bolt

Paine Expansion Shells

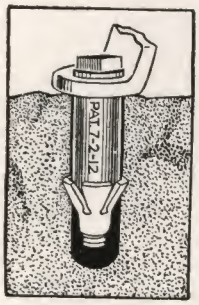
Patented United States and Canada

As strong as the bolt or the material in which it is set.

PRICE LIST NO. 1 EXPANSION SHELLS

Bolt	Length Overall	Hole	Length of Sleeve	Length of Cup	List Price per 100
3/16	1 9/16	9/16	1 1/16	1/2	$5.00
1/4	1 9/16	9/16	1 1/16	1/2	6.00
3/8	2 1/16	7/8	1 1/2	9/16	9.20
3/8	2 5/8	7/8	1 5/8	9/16	9.25
3/8	3 1/8	7/8	2 9/16	9/16	9.30
1/2	3 1/8	1 1/8	2 7/16	11/16	10.70
3/4	4 13/16	1 9/16	4 1/8	11/16	18.30

Where brass is required—Prices on application.



Type No. 2—Used with Machine Screw or Bolt

PRICE LIST NO. 2 EXPANSION SHELLS

Bolt	Machine Screw	Length Over All	Hole	Length of Sleeve	Length of Cup	List Price Per 100
*1/8	8-32	23/32	5/16	1/2	7/32	$4.50
3/16	10-24	5/8	3/8	3/16	7/16	4.00
3/16	10-24	1 1/16	3/8	11/16	7/16	5.00
3/16	10-24	1 5/16	3/8	7/8	7/16	5.05
3/16	10-24	1 9/16	3/8	1 1/8	7/16	5.10
1/4	14-20	13/16	9/16	5/16	1/2	5.00
1/4	14-20	1 9/16	9/16	1 1/16	1/2	6.00
5/16	18-18	1 13/16	5/8	1 1/8	11/16	7.15

*Made in Brass only. On other sizes, when Brass is required—Prices on application.

Extension Collars. In cases where it is necessary to anchor the shell deeper into the concrete on account of poorly mixed or soft cement than the regular length of the shell would permit we can supply a collar which will give the added length.

Paine Lead Anchors

Machine Screw Type

SETTING PUNCH included without additional charge with every box of anchors.

LIST PRICES, NOT INCLUDING SCREWS

Anchor Size No.	Minimum Dimensions of Holes Required Diam.	Depth	Shipping Wt. Lbs. per 1000	Per 100
6-32	1/4"	3/8"	7 1/2	$3.80
8-32	5/16"	1/2"	15	4.50
10-24	3/8"	5/8"	22 1/2	4.95
12-24	7/16"	3/4"	34	6.50
1/4-20	1/2"	7/8"	50 1/2	7.20
5/16-18	5/8"	1"	95	9.75
3/8-16	3/4"	1 1/4"	162	12.00
1/2-13	7/8"	1 1/2"	221	15.00
5/8-11	1 1/8"	2"	512	25.00

Packed 50 or 100 in Box. Subject to Prevailing Discounts.

Bolt and Nut Type

LISTS—100—COMPLETE WITH BOLTS

Bolt Dia.	Drilling Dia.	Drilling Depth	Length of Bolt	1 1/2"	1 3/4"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"
1/4"	1/2"	1"	List 100	$ 5.60	$ 5.80	$ 5.90	$ 6.20	$ 6.50	$ 6.80	$ 7.10		
			Sh. Wt., lbs.	6 3/4	7	7 1/2	8	8 1/4	9 1/4	10		
5/16"	1/2"	1 1/4"	List 100		7.30	7.50	7.90	8.30	8.70	9.10		
			Sh. Wt., lbs.		9	9 1/2	10 1/2	11 1/2	12 1/2	12 3/4		
3/8"	5/8"	1 1/2"	List 100			10.50	11.00	11.50	12.00	12.50	$13.50	$14.50
			Sh. Wt., lbs.			15	16	17 1/2	19	20 3/4	22 1/2	25
1/2"	7/8"	2"	List 100					23.00		24.50	26.00	27.50
			Sh. Wt., lbs.					38 1/2		41 1/2	47	52 1/2

Packed 50 or 100 in Box. Subject to Prevailing Discounts.

Brass Machine Screw Nuts

Square and Hexagon

LIST PRICES

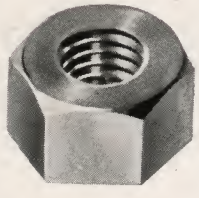
Screw Size	Coarse Thread	Fine Thread	Diameter Across Flats		Thickness		HEXAGON Per 100	HEXAGON Per Gross	SQUARE Per 100	SQUARE Per Gross
2	56	64	3/16	.187	1/16	.066	$ .66	$ .95	$ .66	$ .95
3	48	56	3/16	.187	1/16	.066	.66	.95	.66	.95
4	40	48	1/4	.250	3/32	.098	.56	.80	.56	.80
5	40	44	5/16	.312	7/64	.114	.70	1.00	.70	1.00
6	32	40	5/16	.312	7/64	.114	.70	1.00	.70	1.00
8	32	36	11/32	.343	1/8	.130	.87	1.25	.87	1.25
10	24	32	3/8	.375	1/8	.130	.97	1.40	.97	1.40
12	24	28	7/16	.437	5/32	.161	1.67	2.40	1.67	2.40
1/4	20	28	7/16	.437	3/16	.193	1.95	2.80	1.95	2.80
5/16	18	24	9/16	.562	7/32	.225	3.95	5.70	3.95	5.70
3/8	16	24	5/8	.625	1/4	.257	5.40	7.80	5.40	7.80

Steel Machine Screw Nuts

Square and Hexagon

2	56	64	3/16	.187	1/16	.066	.31	.45	.28	.40
3	48	56	3/16	.187	1/16	.066	.31	.45	.28	.40
4	40	48	1/4	.250	3/32	.098	.24	.34	.22	.31
5	40	44	5/16	.312	7/64	.114	.25	.36	.23	.33
6	32	40	5/16	.312	7/64	.114	.25	.36	.23	.33
8	32	36	11/32	.343	1/8	.130	.28	.40	.24	.35
10	24	32	3/8	.375	1/8	.130	.30	.43	.26	.37
12	24	28	7/16	.437	5/32	.161	.44	.63	.39	.56
1/4	20	28	7/16	.437	3/16	.193	.50	.72	.44	.63
5/16	18	24	9/16	.562	7/32	.225	.94	1.35	.77	1.10
3/8	16	24	5/8	.625	1/4	.257	1.18	1.70	1.04	1.50

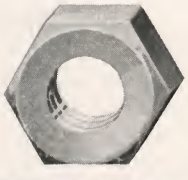
Coarse threads in Machine Screw Nuts more commonly used.



Semi-Finished Hexagon Brass Nuts

Cast Hexagon Brass Nuts

National Coarse Thread

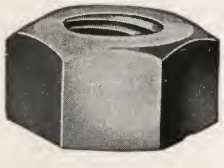


Diameter of Bolt	Number of Threads	U. S. STANDARD Width Across Flat	Thickness Regular Nut	Thickness Jam Nut	Milled Price Per 100	Cast Price Per 100	AMERICAN STANDARD Width Across Flat	Thickness Regular Nut	Milled Price Per 100	Diameter of Bolt
3/16	24	3/8	3/16	5/32	$ 1.40	$	7/16	7/32	$ 2.16	1/4
1/4	20	1/2	1/4	3/16	2.40	.....	9/16	17/64	2.88	5/16
5/16	18	19/32	5/16	7/32	3.20	.....	5/8	21/64	4.68	3/8
3/8	16	11/16	3/8	1/4	5.20	3.75	3/4	3/8	6.48	7/16
7/16	14	3/4	7/16	9/32	7.20	4.00	13/16	7/16	8.64	1/2
1/2	13	7/8	1/2	5/16	9.60	5.00	1	35/64	15.30	5/8
9/16	12	15/16	9/16	11/32	15.00	7.00	1 1/8	21/32	24.30	3/4
5/8	11	1 1/16	5/8	3/8	17.00	8.75	1 5/16	49/64	40.50	7/8
3/4	10	1 1/4	3/4	7/16	27.00	12.00	1 1/2	7/8	61.20	1
7/8	9	1 7/16	7/8	1/2	45.00	18.00				
1	8	1 5/8	1	9/16	68.00	25.00				
1 1/8	7	1 13/16	1 1/8	5/8	120.00	37.50				
1 1/4	7	2	1 1/4	3/4	145.00	50.00				
1 3/8	6	2 3/16	1 3/8	13/16	180.00	65.00				
1 1/2	6	2 3/8	1 1/2	7/8	230.00	75.00				
1 3/4	5	2 3/4	1 3/4	.....	340.00	150.00				
2	4 1/2	3 1/8	2	.....	475.00	250.00				

Our semi-finished brass nuts are milled from the bar, accurate and well finished. Nuts made to special dimensions or tapping furnished promptly to order. American Standard Jam Nuts furnished promptly to order. Cast Jam Nuts are not stock.

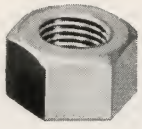
Copper Hexagon Nuts

U. S. S. National Coarse Thread



Diameter of Bolt	Number of Threads	Width Across Flat	Thickness	List Per 100
1/4	20	1/2	1/4	$ 4.80
5/16	18	19/32	5/16	6.40
3/8	16	11/16	3/8	10.40
1/2	13	7/8	1/2	19.20
5/8	11	1 1/16	5/8	34.00
3/4	10	1 1/4	3/4	54.00
7/8	9	1 7/16	7/8	90.00
1	8	1 5/8	1	136.00

S. A. E. Hexagon Brass Nuts



Semi-Finished

Diameter of Thread	Threads Per Inch	Width Across Flats	Thickness Regular Nuts	Thickness Jam Nuts	List Price Per 100
1/4	28	7/16	7/32	5/32	$ 2.40
5/16	24	1/2	17/64	3/16	3.20
3/8	24	9/16	21/64	1/4	5.20
7/16	20	5/8	3/8	1/4	7.20
1/2	20	3/4	7/16	5/16	9.60
9/16	18	7/8	31/64	5/16	15.00
5/8	18	15/16	35/64	3/8	17.00
3/4	16	1 1/16	21/32	3/8	27.00
7/8	14	1 1/4	49/64	7/16	45.00
1	14	1 7/16	7/8	1/2	68.00

S. A. E. Brass Nuts are widely used in the automotive trade for original equipment and repair. They are accurately made and well finished. Special sizes or types furnished promptly to order.

Hexagon Silicon Bronze Nuts

U. S. Standard—Semi-Finished

Diameter of Thread	Number of Threads	Width (Hex.)	Thickness Regular Nuts	Thickness Jam* Nuts	List Price Per 100
6	32	5/16	7/64	.....	$ 0.75
8	32	11/32	1/8	.....	.90
10	24	3/8	1/8	.....	1.20
10	32	3/8	1/8	.....	1.20
1/4	20	7/16	7/32	5/32	4.75
5/16	18	9/16	17/64	3/16	7.25
3/8	16	5/8	21/64	7/32	9.45
7/16	14	3/4	3/8	1/4	12.50
1/2	13	13/16	7/16	5/16	15.00
5/8	11	1	35/64	3/8	26.80
3/4	10	1 1/8	21/32	7/16	47.25
7/8	9	1 5/16	49/64	1/2	61.40
1	8	1 1/2	7/8	9/16	110.25

*Jam nuts are not carried in stock but are furnished to the extent that they may be in stock or made to order at prices in proportion to quantity. Special sizes and types of Silicon Bronze nuts furnished promptly to order.

Hexagon Brass Cap Nuts

Size of Thread	Width Across Flats	Height Inches	Minimum Depth of Threads	List Per 100 Plain or N. P.	List Per 100 Chromium Plated
4 -36	1/4	1/4	5/32	$ .70	$ 1.70
6 -32	5/16	9/32	3/16	.80	1.80
8 -32	5/16	9/32	3/16	.80	1.80
10 -24	3/8	11/32	7/32	1.00	2.10
10 -32	3/8	11/32	7/32	1.00	2.10
12 -24	3/8	11/32	7/32	1.00	2.10
1/4 -20 (Small)	7/16	3/8	1/4	1.25	2.45
1/4 -28	7/16	3/8	1/4	1.25	2.45
1/4 -20 (Large)	1/2	13/32	9/32	1.60	3.00
5/16-18	9/16	7/16	9/32	2.00	3.50
5/16-24	9/16	7/16	9/32	2.00	3.50
3/8 -16	5/8	1/2	5/16	2.80	4.60
3/8 -24	5/8	1/2	5/16	2.80	4.60
7/16-14	3/4	9/16	3/8	4.50	6.50
1/2 -13	3/4	9/16	3/8	4.50	6.50
5/8 -11	15/16	3/4	7/16	15.00	20.00
3/4 -10	1 1/16	7/8	1/2	25.00	35.00

Hexagon Bronze Nuts

U. S. Standard Semi-Finished

List Price Per Hundred

Diameter of Bolt	Number of Threads	Width Across Flats	Thickness Regular Nut	Thickness Jam Nut	Price Per 100
1/4	20	7/16	7/32	5/32	2.40
5/16	18	9/16	17/64	3/16	3.20
3/8	16	5/8	21/64	7/32	5.20
7/16	14	3/4	3/8	1/4	7.20
1/2	13	13/16	7/16	5/16	9.60
5/8	11	1	35/64	3/8	17.00
3/4	10	1 1/8	21/32	7/16	27.00
7/8	9	1 5/16	49/64	1/2	45.00
1	8	1 1/2	7/8	9/16	68.00

U. S. Standard Bronze Nuts are principally used where the nut is required of bronze, to resist certain chemical conditions, or in conjunction with a bolt where specifications require all bronze material.

Jam Nuts in these sizes are made to order only, or furnished to the extent that they may be in stock.

Hexagon Steel Nuts and Jam Nuts

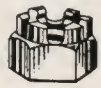
U. S. Standard Semi-Finished

Diameter of Bolt	Number of Threads	Width Across Flats	Regular Nut Thickness	Regular Nut Carton Quantity	Jam Nut Thickness	Jam Nut Carton Quantity	Price Per 100
1/4	20	1/2	1/4	100	3/16	100	$ 0.86
5/16	18	19/32	5/16	100	7/32	100	1.15
3/8	16	11/16	3/8	100	1/4	100	1.55
7/16	14	25/32	7/16	100	9/32	100	2.19
1/2	13	7/8	1/2	100	5/16	100	2.76
9/16	12	31/32	9/16	100	11/32	100	3.80
5/8	11	1 1/16	5/8	100	3/8	100	4.60
3/4	10	1 1/4	3/4	50	7/16	50	6.56
7/8	9	1 7/16	7/8	25	1/2	25	10.06
1	8	1 5/8	1	25	9/16	25	13.80
1 1/8	7	1 13/16	1 1/8	25	5/8	25	19.21
1 1/4	7	2	1 1/4	25	3/4	25	26.11
1 3/8	6	2 3/16	1 3/8	25	13/16	25	36.80
1 1/2	6	2 3/8	1 1/2	20	7/8	20	48.19
1 3/4	5	2 3/4	1 3/4	....	1	....	93.04
2	4 1/2	3 1/8	2	....	1 1/8	....	135.70

S. A. E. Hexagon Steel Nuts & Jam Nuts—Semi-Finished

1/4	28	7/16	7/32	100	5/32	100	$ 0.75
5/16	24	1/2	17/64	100	3/16	100	.86
3/8	24	9/16	21/64	100	1/4	100	1.09
7/16	20	5/8	3/8	100	1/4	100	1.50
1/2	20	3/4	7/16	100	5/16	100	1.90
9/16	18	7/8	31/64	100	5/16	100	2.88
5/8	18	15/16	35/64	100	3/8	100	3.68
3/4	16	1 1/16	5/32	50	3/8	50	5.75
7/8	14	1 1/4	49/64	25	7/16	25	9.20
1	14	1 7/16	7/8	25	1/2	25	13.34
1 1/8	12	1 5/8	63/64	25	9/16	25	18.98
1 1/4	12	1 13/16	1 3/32	25	5/8	25	25.88
1 3/8	12	2	1 13/64	25	3/4	25	36.23
1 1/2	12	2 3/16	1 5/16	20	13/16	20	47.15

S. A. E. Castellated Semi-Finished Steel Nuts

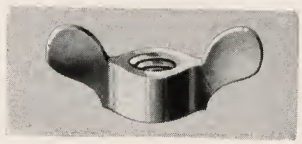


Diameter of Bolt	Threads Per Inch	Width Across Flats	Thickness	Width of Slot	Depth of Slot	Price Per 100
1/4	28	7/16	9/32	5/64	3/32	$ 1.32
5/16	24	1/2	21/64	5/64	3/32	1.55
3/8	24	9/16	13/32	1/8	1/8	1.84
7/16	20	5/8	29/64	1/8	1/8	2.30
1/2	20	3/4	9/16	1/8	3/16	3.28
9/16	18	7/8	39/64	5/32	3/16	4.83
5/8	18	15/16	23/32	5/32	1/4	5.64
3/4	16	1 1/16	13/16	5/32	1/4	8.97
7/8	14	1 1/4	29/32	5/32	1/4	12.36
1	14	1 7/16	1	5/32	1/4	18.40

For nuts with left hand thread, Tapping other than American Standard Coarse Threads, or Double Countersink, prices quoted on application.

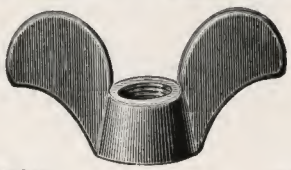
Brass Wing Nuts

List Price per Hundred



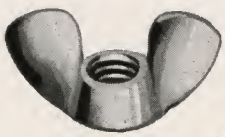
Size	FORGED Width Across Wings	Price Per 100	Size	PRESSED Width Across Wings	Price Per 100
4-36	25/32	$1.50	12-24	13/16	$ 1.50
6-32	13/16	1.50	1/4 -20	1 1/16	2.25
8-32	13/16	1.50	5/16-18	1 3/16	3.75
10-24	13/16	1.50	3/8 -16	1 3/8	5.50
10-32	13/16	1.50	1/2 -13	1 7/8	15.25

Cast Brass Thumb Nuts



Thread	Style No.	Price Per 100	Thread	Style No.	Price Per 100
8-32	29	$ 4.60	1/2-13	35	$20.00
10-24	30	5.00	5/8-11	36	36.00
1/4 -20	31	6.00	3/4-10	37	42.00
5/16-18	32	7.00	7/8- 9	38	54.00
3/8 -16	33	10.00	1- 8	39	64.00
7/16-14	34	15.00			

Steel Wing Nuts



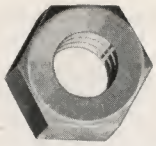
Machine Screw Size	Number of Threads	Price Per 100	Machine Screw Size	Number of Threads	Price Per 100
1/4	20	$1.00	7/16	14	$3.30
5/16	18	1.25	1/2	13	3.30
3/8	16	1.60			

Knurled Brass Nuts

Thread	Diameter of Head	Height	Price Per 100	Thread	Diameter of Head	Height	Price Per 100
6-32	13/32	9/32	$1.20	10-24	1/2	21/64	$1.50
8-32	7/16	5/16	1.30	12-24	9/16	11/32	1.70
10-32	1/2	21/64	1.50	1/4-20	5/8	3/8	2.00

18-8 Stainless Steel Nuts

ALLEGHENY METAL



Semi-Finished—Chamfered Washer Face

New American Standard

Diameter of Thread	Number of Threads	Width Across Flats	Thickness Regular Nuts	Thickness Jam Nuts	Price Per 100
6	32	5/16	7/64	.....	$ 7.70
8	32	11/32	1/8	.....	7.70
10	24	3/8	3/16	.....	8.40
1/4	20	1/2	1/4	5/32	8.80
5/16	18	9/16	5/16	3/16	10.00
3/8	16	11/16	3/8	7/32	12.00
7/16	14	3/4	7/16	1/4	15.00
1/2	13	7/8	1/2	5/16	18.00
5/8	11	1 1/16	5/8	3/8	30.00
3/4	10	1 1/4	3/4	7/16	48.00
7/8	9	1 7/16	7/8	1/2	65.00
1	8	1 5/8	1	9/16	90.00

Stainless Steel

Flat Punched Washers

18-8 Chromium-Nickel

ALLEGHENY METAL

Bolt Size	Outside Diameter	Inside Diameter	Thickness	Price Per 100
3/16	7/16	13/64	.037	$ 1.50
1/4	5/8	9/32	.050	2.50
5/16	7/8	3/8	.050	3.25
3/8	1	7/16	.078	7.80
1/2	1 3/8	17/32	.090	10.60
5/8	1 3/4	11/16	.130	16.00
3/4	2	13/16	.148	20.00
1	2	1 1/16	.148	32.00

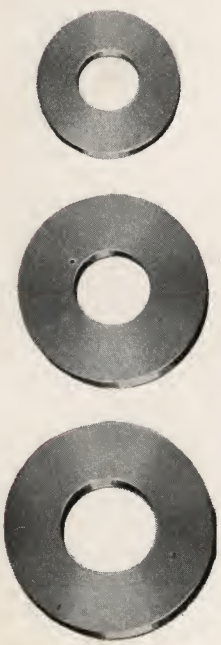
Stainless Steel Lock Washers

18-8 Chromium-Nickel

ALLEGHENY METAL

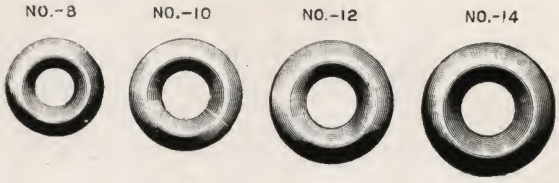
Bolt Size	Section Width	Section Thickness	Price Per 100
No. 6	5/64	1/32	$ 2.00
No. 8	5/64	3/64	2.50
3/16	3/32	3/64	3.00
1/4	3/32	1/16	3.50
5/16	1/8	1/16	4.00
3/8	1/8	3/32	4.50
1/2	11/64	1/8	7.50
5/8	13/64	5/32	14.00
3/4	1/4	3/16	18.00
7/8	5/16	1/4	36.00
1	5/16	1/4	45.00

Brass Cut Washers



Order By Number	Screw Size	Bolt Size	Outside Diameter	Inside Diameter	Thickness	Approx. No. Per Lb.	Price Per Thousand	Price Per Found
B 2	3	.....	1/4	.101	.020	4,000	$ .50	$2.00
B 3	4	.....	9/32	.125	.025	2,500	.60	1.50
B 4	6	1/8	3/8	.150	.032	1,100	.91	1.00
B 5	8	.....	3/8	.172	.032	1,170	.85	1.00
B13	8	.....	7/16	.170	.036	725	1.24	.90
B 6	10	.....	7/16	.195	.036	760	1.18	.90
B14	10	3/16	1/2	.195	.040	480	1.67	.80
B 7	12	.....	1/2	.228	.040	525	1.52	.80
B15	12	.....	9/16	.228	.040	380	2.10	.80
B 8	14	.....	9/16	.260	.040	420	1.90	.80
B16	14	1/4	11/16	.260	.051	210	3.57	.75
B 9	16	.....	5/8	.285	.040	340	2.21	.75
B17	16	.....	3/4	.285	.064	135	5.55	.75
B10	18	.....	11/16	5/16	.051	230	3.26	.75
B18	18	.....	7/8	5/16	.064	100	7.50	.75
B11	20	.....	3/4	11/32	.064	150	5.00	.75
B19	20	5/16	7/8	.337	.064	103	7.20	.75
B12	24	.....	7/8	.391	.064	108	6.95	.75
B20	24	3/8	1	.385	.081	64	11.52	.70
B21	....	7/16	1 3/16	1/2	.081	45	15.50	.70
B22	....	1/2	1 3/8	9/16	.091	29	24.10	.70
B23	....	5/8	1 5/8	11/16	.091	21	33.30	.70
B24	....	3/4	2	13/16	.125	10	70.00	.70
B25	....	7/8	2 3/8	15/16	.144	6	116.50	.70
B26	....	1	2 1/2	1 1/16	.144	5 3/4	121.50	.70

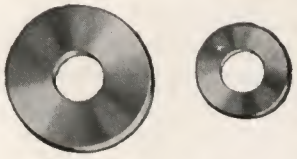
Countersunk Brass Finishing Washers



Screw Size	Outside Diameter	Inside Diameter	Thickness	List Price Per Gross Plain	List Price Per Gross Nickel Plated
4	23/64	.120	.015	$0.25	$0.28
5	25/64	.143	.015	.27	.31
6	7/16	.167	.015	.30	.34
8	1/2	.193	.018	.35	.40
10 or 3/16	37/64	.228	.020	.45	.52
12	5/8	.234	.022	.52	.60
14 or 1/4	23/32	.288	.022	.58	.68
16	3/4	.319	.023	.80	.93
18 or 5/16	55/64	.355	.025	.95	1.10
3/8	1	.484	.025	1.20	1.45

Flush type finishing washers furnished to order.

Copper Cut Washers



Bolt Size	Outside Diameter	Inside Diameter	Thickness	Approx. Number Per Lb.	List Price Per Thousand	List Price Per Pound
5/16	7/8	.337	.064	97	$ 16.30	$1.50
3/8	1	.385	.081	61	23.00	1.40
1/2	1 3/8	9/16	.091	28	50.00	1.40
5/8	1 5/8	11/16	.091	20	70.00	1.40
3/4	2	13/16	.125	9 1/2	147.50	1.40
7/8	2 3/8	15/16	.144	5 3/4	244.00	1.40
1	2 1/2	1 1/16	.144	5 1/2	255.00	1.40

Silicon Bronze Cut Washers

Screw or Bolt Size	Outside Diameter	Inside Diameter	Thickness	List Price Per 100
No. 6	5/16	.147	.032	$ 0.40
8	3/8	.172	.032	.60
10	7/16	.200	.032	.80
1/4	11/16	.260	.051	.95
5/16	7/8	.337	.064	2.15
3/8	1	.391	.064	3.05

Screw or Bolt Size	Outside Diam.	Inside Diam.	Thickness	List Price Per 100
1/2	1 1/4	9/16	.081	$ 7.55
5/8	1 1/2	11/16	.091	11.65
3/4	1 7/8	13/16	.102	19.00
7/8	2 1/4	15/16	.114	23.45
1	2 1/2	1 1/16	.128	32.75

Special sizes and types of Silicon Bronze washers furnished to order.

Silicon Bronze Lock Washers

Bolt Diameter	Section	List Per 1000	Bolt Diameter	Section	List Per 1000
No. 6	5/64x1/32	$ 7.50	5/16	1/8 x1/16	$ 23.00
8	5/64x3/64	9.00	3/8	1/8 x3/32	35.00
10	3/32x3/64	12.00	1/2	11/64x1/8	75.00
12	3/32x1/16	14.50	5/8	13/64x5/32	157.00
1/4	3/32x1/16	16.50	3/4	1/4 x3/16	250.00

Silicon Bronze lock washers are used in place of brass or phosphor bronze, due to their toughness, spring and durability. Sizes other than listed furnished promptly to order.

Molybdenum Steel Lock Washers

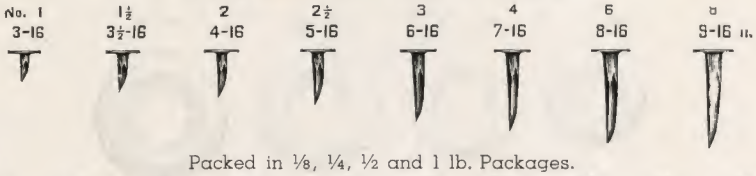
SAE Standard

Screw or Bolt Size	Steel Section Width & Thickness	List Price Per 1,000	Approx. Net Wt. per M
No. 2	1/32"x1/32"	$2.45	2 Oz.
4	1/16"x1/32"	2.30	5 Oz.
6	5/64"x1/32"	2.15	7 Oz.
8	5/64"x3/64"	2.05	12 Oz.
10	3/32"x3/64"	2.00	19 Oz.
12	3/32"x1/16"	2.25	28 Oz.
1/4"	3/32"x1/16"	2.25	30 Oz.
5/16"	1/8" x1/16"	3.00	3 Lb. 1 Oz.
3/8"	1/8" x3/32"	3.75	5 Lb.
7/16"	5/32"x1/8"	6.40	10 Lb. 12 Oz.
1/2"	11/64"x1/8"	7.60	13 Lb. 1 Oz.

Bolt Size	Steel Section Width & Thickness	List Price Per 1,000	Approx. Net Wt. per M
9/16"	3/16"x1/8"	$ 10.25	15 Lb. 10 Oz.
5/8"	13/64"x5/32"	15.80	23 Lb. 12 Oz.
11/16"	7/32"x3/16"	20.80	35 Lb.
3/4"	1/4" x3/16"	25.60	43 Lb.
7/8"	17/64"x3/16"	39.30	51 Lb. 8 Oz.
1"	5/16"x1/4"	65.70	90 Lb. 13 Oz.
1 1/8"	3/8" x1/4"	90.00	125 Lb.
1 1/4"	7/16"x1/4"	124.00	197 Lb. 6 Oz.
1 3/8"	7/16"x5/16"	140.00	214 Lb. 4 Oz.
1 1/2"	1/2" x5/16"	170.00	282 Lb.

Intermediate widths and sections for each of the above sizes supplied on factory shipment or from stock if available.

Copper Flat Head Tacks



Packed in ⅛, ¼, ½ and 1 lb. Packages.

Number	1	1½	2	2½	3	4	6	8	10	12	14	16	18	20	22	24
Length	3/16	3/32	¼	5/16	3/8	7/16	½	9/16	5/8	11/16	¾	13/16	⅞	15/16	1	1⅛
No. to 1 lb.	....	....	6000	4000	3000	1800	1570	1400	930	900	850	750	640	600	525	450

Copper Oval Head Tacks

Packed in ⅛, ¼, ½ and 1 lb. Packages.

Number	1	1½	2	2½	3	4	6	8	10	12	14	16	18	20	22	24
Length	3/16	3/32	¼	5/16	3/8	7/16	½	9/16	5/8	11/16	¾	13/16	⅞	15/16	1	1⅛
No. to 1 lb.	....	....	5000	3500	2700	1720	1500	1350	900	875	825	725	600	575	500	425

Copper Common Wire Nails—Standard Sizes

Length	Gauge	D. Wgt.	No. Per Lb.	Length	Gauge	D. Wgt.	No. Per Lb.	Length	Gauge	D. Wgt.	No. Per Lb.
⅝	16	....	1406	1½	12	4D	260	*3	9	10D	57
¾	16	....	1050	1¾	12	5D	216	*3½	8	16D	40
¾	15	....	780	1¾	11	5D	190	*4	6	20D	30
⅞	15	....	750	2	11	6D	150	4½	5	30D	15
1	15	2D	765	2	10	6D	102	5	4	40D	12
1¼	14	2D	522	2½	10	8D	84	*6	2	60D	7

Copper Wire Nails—Special Sizes

Length	Gauge	D. Wgt.	No. Per Lb.	Length	Gauge	D. Wgt.	No. Per Lb.	Length	Gauge	D. Wgt.	No. Per Lb.
¾	14	....	709	1½	14	4D	.....	2¼	9	7D	72
⅞	12	....	602	1⅞	12	....	215	2¼	11	7D	131
1	12	2D	393	2	6	6D	.....	2¾	10	9D	73
1	14	2D	680	2	12	6D	170	3¼	12	12D	.....
1¼	11	3D	196	2¼	8	7D	51				

Copper Roofing or Slating Nails

Standard Sizes			Special Sizes		
Length	Gauge	No. Per Lb.	Length	Gauge	No. Per Lb.
¾	12	330	⅞	12	303
1	12	270	1¾	12	100
1¼	10	144	2	9	84
1¼	11	196	2	11	144
1¼	12	231	2	12	200
1½	10	134	2¼	10	85
1½	11	160	2½	8	60
1½	12	210	2½	10	75
1¾	10	112			
2	10	100			

Copper Cut Nails

Length	D. Wgt.	No. Per Lb.
⅝	....	907
¾	....	660
⅞	....	566
1	2D	466
1¼	3D	285
1½	4D	200
1¾	5D	165
2	6D	97
2¼	7D	77
2½	8D	69
2¾	9D	55
3	10D	44

Copper Wire Brads

Lengths
½, ⅝, 2

Brass Wire Nails

Cement Coated
(Airplane)

Gauge	Length
18	½, ⅝, ¾, 1, 1¼, 1½, 2

Duralumin Wire Nails

Stubs Gauge	Length
12	1
11	1¼
10	1½

Copper Cut Finishing Nails

Lengths
½, ¾, ⅞, 1½, 2

Sheathing Nails

	Lengths	
Composition	1"	1⅜"
Copper	1"	1¼"

Stainless Steel Wire Nails

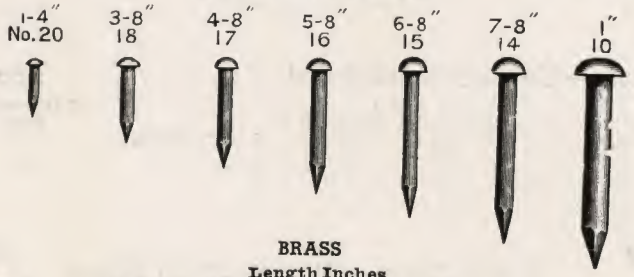
Length	Stubs Gauge	Penny	Number Per Lb.	Price Per Pound
1	15	2	797	$2.72
1¼	14	3	480	2.62
1½	13	4	310	2.54
1¾	13	5	299	2.54
2	12	6	192	2.34
2¼	11	7	148	2.26
2½	10	8	97	2.20

18—8 Chromium-Nickel

ALLEGHENY METAL

Length	Stubs Gauge	Penny	Number Per Lb.	Price Per Pound
3	9	10	63	$2.16
3¼	9	12	54	2.16
3½	8	16	45	2.10
4	6	20	26	1.92
4½	5	30	20	1.88
5	4	40	16	1.86
6	2	60	9	1.80

Escutcheon Pins



List Adopted April 12, 1923.

BRASS

List Price Per Pound

Wire Gauge No. B. W. G.	Length Inches 3/16	1/4	3/8	1/2	5/8	3/4	7/8	1	1¼	1½	1¾	2
10	.....	.....	$0.85	$0.80	$0.78	$0.76	$0.75	$0.74	$0.72	$0.71	$0.70	$0.69
11	.....	.....	.95	.87	.84	.82	.80	.78	.76	.75	.74	.73
12	.....	$1.15	.98	.93	.90	.87	.85	.83	.79	.77	.76	.75
13	.....	1.20	1.03	.98	.93	.90	.87	.84	.80	.78	.....	.....
14	*$1.50	1.25	1.05	1.00	.96	.92	.88	.85	.81	.80	.....	.....
15	*1.60	1.35	1.15	1.07	1.00	.95	.92	.90	.86	.84	.....	.....
16	*1.75	1.45	1.20	1.10	1.03	.99	.96	.94	.90	.88	.....	.....
17	*2.00	1.60	1.40	1.25	1.17	1.10	1.04	1.00	.96	.94	.....	.....
18	*2.50	1.90	1.50	1.35	1.27	1.20	1.15	1.10	.....	.....	.....	.....
19	*2.75	2.15	1.75	1.60	1.45	1.35	1.30	1.25	.....	.....	.....	.....
20	*3.00	2.35	2.10	1.95	1.80	1.65	.....	.....	.....	.....	.....	.....
21	*3.25	*2.75	*2.50	*2.30	.....	.....	.....	.....	.....	.....	.....	.....
22	*3.50	*3.15	*2.85	*2.60	.....	.....	.....	.....	.....	.....	.....	.....
24	*4.00	*3.50	*3.10	*2.85	.....	.....	.....	.....	.....	.....	.....	.....

Sizes preceded by an asterisk (*) not stocked. Prices on request.

List Adopted April 12, 1923.

STEEL

List Price Per Pound

Wire Gauge No. B. W. G.	Length Inches 3/16	1/4	3/8	1/2	5/8	3/4	7/8	1	1¼	1½	1¾	2
10	.....	.....	$0.35	$0.30	$0.28	$0.26	$0.24	$0.23	$0.21	$0.20	$0.19	$0.18
11	.....	.....	.40	.35	.32	.30	.28	.26	.23	.22	.21	.20
12	.....	.....	.50	.42	.37	.34	.32	.30	.26	.24	.23	.22
13	.....	.....	.55	.46	.41	.37	.34	.32	.28	.26	.....	.....
14	.....	.....	.60	.50	.45	.43	.38	.35	.31	.29	.....	.....
15	.....	$0.85	.70	.55	.50	.45	.41	.38	.34	.32	.....	.....
16	.....	.95	.75	.60	.53	.48	.45	.42	.38	.36	.....	.....
17	.....	1.05	.85	.70	.63	.57	.52	.49	.43	.40	.....	.....
18	.....	1.25	1.00	.90	.80	.75	.70	.65	.....	.....	.....	.....
19	.....	1.50	1.15	1.00	.90	.80	.75	.70	.....	.....	.....	.....
20	*$2.00	*1.70	*1.50	*1.30	*1.15	*1.00	.....	.....	.....	.....	.....	.....
21	*2.15	*1.95	*1.75	*1.60	.....	.....	.....	.....	.....	.....	.....	.....
22	*2.40	*2.15	*1.90	*1.70	.....	.....	.....	.....	.....	.....	.....	.....
24	*3.00	*2.50	*2.10	*1.85	.....	.....	.....	.....	.....	.....	.....	.....

Sizes preceded by an asterisk (*) not stocked. Prices on request.

PACKING: 1 lb. Papers.—5 and 10 lb. Packages—25, 50 and 100 lb. Boxes Bulk.

APPROXIMATE NUMBER OF PINS TO THE POUND

No.	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2
12	.....	720	650	460	416	400	336	272	212	192	170
13	.....	1,120	948	672	528	480	400	380	320	229	220
14	1,875	1,312	1,100	950	830	692	600	432	378	320	272
15	2,440	1,820	1,376	1,152	960	888	720	576	580	432	400
16	3,100	2,240	1,720	1,460	1,275	1,130	980	720	592	578	464
17	3,540	2,700	2,076	1,812	1,500	1,185	1,051	928	800	640	.....
18	4,972	3,175	2,550	2,450	2,200	1,740	1,520	1,216	960	.....	.....
19	7,303	5,140	4,130	3,565	2,900	.....	.....	.....	.....	.....	.....
20	9,932	8,419	6,374	5,500	4,155	.....	.....	.....	.....	.....	.....

Brass Rivets—Round Head

SIZE Number or Inches	Decimal Inches	Length Inches
1/16"	.063	1/8, 3/16, 1/4, 5/16
16	.065	1/8, 3/16, 1/4, 5/16, 3/8
14	.083	1/8, 3/16, 1/4, 5/16, 3/8, 1/2
12	.109	3/16, 1/4, 5/16, 3/8, 1/2, 9/16, 5/8, 3/4, 7/8, 1, 1 1/4
1/8"	.125	1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2
10	.134	3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
8	.165	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
3/16"	.188	1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
1/4"	.250	3/8, 1/2, 5/8, 3/4, 7/8, 1 1/4, 1 1/2, 1 3/4, 2
5/16"	.313	1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2
3/8"	.375	1/2, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2

Packed in 1-lb. Boxes.

Brass Rivets—Countersunk Head

SIZE Number or Inches	Decimal Inches	Length Inches
12	.109	3/8
1/8"	.125	1/4, 3/8, 1/2, 5/8, 3/4
3/16"	.188	5/16, 3/8, 1/2, 5/8, 3/4
1/4"	.25	3/8, 1/2, 3/4, 1 3/4
3/8"	.375	7/8
1/2"	.50	1 1/2

Brass Rivets—Cone Head

Diameter Inch	Decimal Inch	Length Inches
3/16	.1875	1/4
1/4	.250	1/4, 5/8, 3/4, 1

Brass Tinners Rivets—Flat Head

Packed 1000 Per Box.

Wght. Lbs. per M.....	1/2	3/4	1	1 1/4	1 1/2	1 3/4
Length Inches.....	5/32	3/16	13/64	7/32	15/64	1/4
Diameter Inches.....	.089	.106	.112	.120	.130	.134

Wght. Lbs. per M.....	2	2 1/2	3	4	5	6
Length Inches.....	17/64	9/32	5/16	11/32	3/8	25/64
Diameter Inches.....	.145	.148	.161	.176	.186	.205

Copper Rivets—Round Head

SIZE Number or Inches	Decimal Inches	Length Inches
1/16"	.063	1/8, 3/16, 1/4, 5/16
16	.065	1/8, 3/16, 1/4, 5/16, 3/8
14	.083	1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4
12	.109	3/16, 1/4, 5/16, 3/8, 1/2, 9/16, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2
1/8"	.125	1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2
10	.134	3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
8	.165	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
3/16"	.188	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2, 2 1/2
1/4"	.250	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2
5/16"	.313	1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 3
3/8"	.375	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 3
1/2"	.500	3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/2, 3
5/8"	.625	1 1/2, 2, 2 1/2, 3
3/4"	.75	1 1/2, 2, 2 1/2, 3

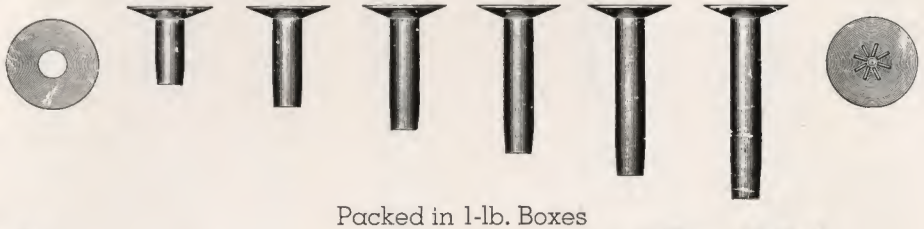
Packed in 1-lb. Boxes.

Round Head Rivets

Approximate Number per pound.

Length	Diameter—Stubs Gauge or Inches 1/2	3/8	5/16	1/4	3/16	No. 8	No. 10	1/8	No. 12	No. 14	No. 16	1/16
1/8	....	....	....	....	.....	.....	.....	832	1384	2000	4800	5100
3/16	....	....	....	....	.....	.....	663	736	1059	1642	3700	3900
1/4	....	....	....	....	256	438	584	640	870	1508	2950	3100
5/16	....	....	....	....	220	352	485	548	777	1412	2400	2560
3/8	....	....	....	76	192	280	432	480	648	1205	2240	.....
1/2	....	32	51	72	144	228	352	384	540	992	1720	.....
5/8	....	29	45	68	130	204	300	336	480	880	.....	.....
3/4	11	26	41	56	116	175	256	304	416	.....	.....	.....
7/8	10	24	37	52	109	161	227	262	360	.....	.....	.....
1	9	22	34	48	98	146	208	224	320	.....	.....	.....
1 1/8	9	20	31	44	90	132	182	207	280	.....	.....	.....
1 1/4	8	19	29	40	83	121	165	192	256	.....	.....	.....
1 3/8	8	18	27	38	76	115	151	171	.....	.....	.....	.....
1 1/2	7	17	25	36	71	109	144	.....	.....	.....	.....	.....
1 3/4	7	15	22	34	63	104	.....	.....	.....	.....	.....	.....
2	6	13	20	30	56							
2 1/4	6	12	18	28	50							
2 1/2	5	11	17	25	....							

Copper Belt Rivets & Burrs



Packed in 1-lb. Boxes

No.	Diam. In. Under Head	Diam. at end of Shank	Length Inches
15	.090	.085	¼, 5/16, ⅜, ½, ¾, 1.....
14	.102	.092	¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞, 1.....
13	.118	.105	¼, 5/16, ⅜, ½, ⅝, ¾.....
12	.137	.123	¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞, 1, 1¼, 1½.....
11	.141	.127	¼, ⅜, ½, ⅝, ¾, ⅞, 1.....
10	.151	.137	¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 2..
9	.161	.145	¼, ⅜, ½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾, 2.....
8	.181	.165	¼, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 1¾, 2
7	.191	.175	¼, ⅜, ½, 9/16, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 1¾, 2.....
6	.228	.205	½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾, 2.....
5	.240	.222	½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾, 2.....

Copper Belt Rivets Only

Packed in 1-lb. Boxes

No.	Diam. In. Under Head	Diam. at end of Shank	Length Inches
15	.090	.085	¼, 5/16, ⅜, ½, ⅝, ¾.....
14	.102	.092	¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, 1.....
13	.118	.105	¼, 5/16, ⅜, ½, ⅝, ¾, 1....
12	.137	.123	¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞, 1, 1¼, 1½.....
11	.141	.127	⅜, ½, ⅝, ¾, ⅞, 1.....
10	.151	.137	¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 2..
9	.161	.145	¼, ⅜, ½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾, 2.....
8	.181	.165	¼, ⅜, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 1¾, 2.....
7	.191	.175	¼, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 1¾, 2
6	.228	.205	½, ⅝, ¾, ⅞, 1, 1¼, 1½, 2
5	.240	.222	½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾, 2.....

Copper Belt Rivets Only

Number to the Pound

Number	5	6	7	8	9	10	11	12	13	14	15
¼"	....	.....	208	246	368	379	480	496	800	1024	1248
5/16	....	.....	192	240	320	352	400	432	640	928	1024
⅜	....	128	168	208	256	320	368	408	528	768	983
7/16	....	110	158	200	250	290	320	368	480	704	.....
½	64	90	152	168	232	256	304	336	432	608	736
9/16	60	88	124	152	200	240	264	304	416	550	.....
⅝	56	78	120	136	192	216	224	272	386	544	640
¾	50	68	104	120	168	184	216	232	320	480	576
⅞	48	64	96	104	144	160	.....	208	288	384	.....
1	44	56	88	96	130	142	.....	192	.....	.....	.....
1⅛	40	52	80	88	124	.....	.....	.....	.....	.....	.....
1¼	36	48	72	84	113	.....	.....	.....	.....	.....	.....
1½	32	44	64	.....	99	.....	.....	.....	.....	.....	.....
Burrs Only	88	184	352	400	560	768	928	1024	1472	2048	3392

Copper Burrs Only

Packed in 1-lb. Packages

Diameter of Hole No.	5	6	7	8	9	10	11	12	13	14	15
Diameter of Hole Dec. Inch	.223	.206	.177	.166	.146	.138	.128	.124	.106	.093	.086
Thickness Dec. Inch	.064	.057	.050	.045	.040	.036	.031	.028	.025	.022	.020

Various manufacturers have different standards for dimensions.

Copper Brake Band Rivets

Countersunk Head

SIZE No.	Diam. Dec. In.	Length Inches
12	.122	3/8, 1/2, 5/8, 3/4, 7/8, 1
10	.138	3/8, 1/2, 5/8, 3/4, 7/8, 1
9	.152	3/8, 1/2, 5/8, 3/4, 7/8, 1
8	.169	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2
7	.184	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2
6	.209	1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2
5	.222	1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2
4	.250	3/4, 1, 1 1/4, 1 1/2,

Diam.	Dec. In.	Length Inches
1/8	.125	3/16, 1/4, 3/8, 1/2, 5/8, 3/4
3/16	.1875	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
1/4	.250	1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2
5/16	.3125	3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2
3/8	.375	3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2

Countersunk Head Copper Rivets

Packed in 1-lb. boxes.

Copper Trunk Rivets—Oval Head

SIZE No.	Decimal Inches	Length Inches
12	.125	1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1
9	.157	1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 1 3/4

Packed in 1-lb. boxes.

Cone Head Copper Rivets

1/4x1/2	3/8x3/4
1/4x3/4	3/8x7/8
1/4x1	3/8x1

Flat Head Copper Rivets

Diam. Inch	Decimal Inch	Length Inches
1/8	.125	3/8, 1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
3/16	.1875	3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2
1/4	.25	1/2, 5/8, 3/4, 7/8, 1, 1 1/4, 1 1/2, 2

Diam. Inch	Decimal Inch	Length Inches
5/16	.3125	3/4, 7/8, 1, 1 1/4, 1 1/2, 2
1/2	.50	1 1/2

Packed in 1-lb. boxes.

Copper Braziers' Rivets

Flat Head

Diam. Inches	Length Inches
1/4	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2
5/16	3/4, 1, 1 1/4, 1 1/2

Diam. Inches	Length Inches
3/8	1, 1 1/4, 1 1/2, 1 3/4, 2
1/2	1, 1 1/4, 1 1/2, 2

Packed in 5-lb. boxes.

Copper Braziers' Rivets

Oval Head

No.	Diam. Inches	Length Under Head
00	5/32	5/16"
0	3/16	3/8
1	1/4	1/2
2	17/64	1/2
3	9/32	5/8
4	5/16	11/16
5	23/64	3/4
6	3/8	13/16
7	7/16	15/16
8	17/32	1 1/8
9	5/8	1 1/4
10	21/32	1 1/4

Packed in 5-lb. boxes.

Copper Tinners' Rivets

Flat Head

Wght. Lbs. Per 1000	Length Inches	Diameter Inches
1/2	5/32	.089
3/4	3/16	.106
1	13/64	.112
1 1/4	7/32	.120
1 1/2	15/64	.130
1 3/4	1/4	.134
2	17/64	.145
2 1/2	9/32	.148
3	5/16	.161
4	11/32	.176
5	3/8	.186
6	25/64	.205
8	7/16	.2245
10	15/32	.238
12	1/2	.259

Packed 1000 to the box.

Stainless Steel Round Head Rivets

18—8 Chromium-Nickel

ALLEGHENY METAL

Size	Price Per Pound	Size	Price Per Pound	Size	Price Per Pound	Size	Price Per Pound
1/16x 5/16	$4.50	1/8 x 3/4	$4.00	3/16x1 1/8	$4.00	5/16x 5/8	$3.50
1/16x 3/8	4.50	1/8 x1	4.00	3/16x1 1/4	4.00	5/16x 7/8	3.50
1/16x 1/2	4.50	No. 8x 1/4	4.00	1/4 x 3/8	3.50	5/16x1	3.50
3/32x 1/8	4.50	5/32x 3/8	4.00	1/4 x 1/2	3.50	5/16x1 1/4	3.50
3/32x 1/4	4.50	5/32x 1/2	4.00	1/4 x 5/8	3.50	5/16x1 1/2	3.50
3/32x 5/16	4.50	5/32x 3/4	4.00	1/4 x 3/4	3.50	5/16x2	3.50
3/32x 3/8	4.50	3/16x 1/4	4.00	1/4 x 7/8	3.50	3/8 x 5/8	3.50
1/8 x 1/4	4.00	3/16x 3/8	4.00	1/4 x1	3.50	3/8 x 3/4	3.50
1/8 x 5/16	4.00	3/16x 1/2	4.00	1/4 x1 1/4	3.50	3/8 x1	3.50
1/8 x 3/8	4.00	3/16x 5/8	4.00	1/4 x1 3/8	3.50	3/8 x1 1/4	3.50
1/8 x 7/16	4.00	3/16x 3/4	4.00	1/4 x1 1/2	3.50	3/8 x1 1/2	3.50
1/8 x 1/2	4.00	3/16x 7/8	4.00	1/4 x1 5/8	3.50		
1/8 x 5/8	4.00	3/16x1	4.00	1/4 x1 7/8	3.50		
1/8 x11/16	4.00			1/4 x2	3.50		

Stainless Steel Oval and Truss Head Rivets

18—8 Chromium-Nickel

ALLEGHENY METAL

Size	Price Per Pound	Size	Price Per Pound
3/16x 1/4	$4.00	1/4 x 7/16	$3.50
3/16x 5/16	4.00	1/4 x 1/2	3.50
3/16x 3/8	4.00	1/4 x 5/8	3.50
3/16x 3/4	4.00	1/4 x1 1/8	3.50
1/4 x 3/8	3.50	1/4 x1 1/4	3.50

Stainless Steel Countersunk Head Rivets

18—8 Chromium-Nickel

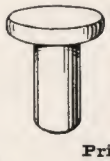
ALLEGHENY METAL

Size	Price Per Pound	Size	Price Per Pound
1/16x 3/16	$4.50	1/4 x 3/8	$3.50
1/16x 1/4	4.50	1/4 x 1/2	3.50
1/8 x 3/8	4.00	1/4 x 5/8	3.50
1/8 x 1/2	4.00	1/4 x 3/4	3.50
1/8 x 3/4	4.00	1/4 x1	3.50
5/32x 9/32	4.00	1/4 x1 1/4	3.50
5/32x 5/16	4.00	1/4 x1 3/8	3.50
5/32x11/32	4.00	1/4 x1 1/2	3.50
5/32x 3/8	4.00	1/4 x2	3.50
5/32x 1/2	4.00	5/16x1	3.50
3/16x 3/8	4.00	5/16x1 1/8	3.50
3/16x 1/2	4.00	5/16x2	3.50
3/16x 5/8	4.00		
3/16x 3/4	4.00		

Stainless Steel Flat Head Tinners' Rivets

18—8 Chromium-Nickel

ALLEGHENY METAL



Size	Diameter	Length	Price Per Pound
8-oz.	.092	5/32	$3.60
10-oz.	.095	11/64	3.60
12-oz.	.106	3/16	3.60
14-oz.	.109	3/16	3.60
1 lb.	.112	13/64	3.60
1½ lbs.	.130	15/64	3.20
1¾ lbs.	.134	1/4	3.20
2 lbs.	.145	17/64	3.20
2½ lbs.	.148	9/32	3.20
3 lbs.	.160	5/16	3.20
4 lbs.	.176	11/32	3.20
5 lbs.	.186	3/8	2.80
6 lbs.	.203	25/64	2.80
8 lbs.	.225	7/16	2.80
10 lbs.	.238	15/32	2.80

Stainless Steel Flat Head Rivets

18—8 Chromium-Nickel

ALLEGHENY METAL

Size	Price Per Pound	Size	Price Per Pound
3/32x3/16	$4.50	3/16x7/16	$4.00
3/32x1/4	4.50	3/16x1/2	4.00
1/8 x 7/32	4.50	3/16x5/8	4.00
1/8 x1/4	4.00	3/16x3/4	4.00
1/8 x5/16	4.00	1/4 x3/8	3.50
1/8 x3/8	4.00	1/4 x1/2	3.50
1/8 x 1/2	4.00	1/4 x5/8	3.50
5/32x 3/8	4.00	1/4 x3/4	3.50
5/32x1/2	4.00	1/4 x1	3.50
5/32x3/4	4.00	1/4 x1 1/4	3.50
3/16x3/8	4.00	1/4 x1 1/2	3.50

For other Stainless Steel Material see Index on Page 8.

Duralumin Rivets

Temper designation 17S

ROUND HEAD

Size Inches	No. Per Lb.
1/16 x 1/8	13900
3/16	10950
1/4	9000
5/16	7600
3/8	5360
1/2	4820
3/32 x 3/16	4170
1/4	3540
5/16	3060
3/8	2650
1/2	2140
5/8	1795
3/4	1560
1/8 x 3/16	2000
1/4	1740
5/16	1515
3/8	1340
1/2	1115
5/8	945

Size Inches	No. Per Lb.
1/8 x 3/4	825
1	655
1 1/8	564
1 1/4	413
5/32 x 1/4	990
5/16	885
3/8	800
7/16	725
1/2	665
5/8	570
3/4	500
1	400
3/16 x 1/4	630
5/16	565
3/8	515
1/2	435
5/8	375
3/4	330

Size Inches	No. Per Lb.
3/16 x 1	270
1 1/4	225
1 1/2	195
1/4 x 1/2	215
5/8	190
3/4	170
7/8	153
1	140
1 1/4	118
1 1/2	103
1 3/4	92
2	81
5/16 x 1/2	124
5/8	110
3/4	96
7/8	90
1	83
1 1/4	71

Size Inches	No. Per Lb.
5/16 x 1 1/2	62
1 3/4	56
2	50
2 1/2	42
3/8 x 3/4	64
1	54
1 1/4	47
1 1/2	41
1 3/4	37
2	34
2 1/2	28
1/2 x 3/4	31
1	27
1 1/4	24
1 3/8	22
1 1/2	21
1 3/4	19
2	17

FLAT HEAD

Size Inches	No. Per Lb.
3/32 x 3/16	4170
1/4	3540
5/16	3060
3/8	2650

Size Inches	No. Per Lb.
3/32 x 1/2	2140
1/8 x 1/4	1740
5/16	1515
3/8	1340

Size Inches	No. Per Lb.
1/8 x 1/2	1115
5/8	945
1/4 x 1/2	215
9/16	200

Size Inches	No. Per Lb.
1/4 x 5/8	190
3/4	170
1	140
1 1/4	118

BRAZIER HEAD

Size Inches	No. Per Lb.
1/16 x 3/16	16120
1/8	13920
3/16	10950
1/4	9000
5/16	7600
3/8	5960
1/2	4820

Size Inches	No. Per Lb.
3/32 x 3/16	4170
1/4	3540
5/16	3060
3/8	2650
1/2	2140

Size Inches	No. Per Lb.
1/8 x 3/16	2000
1/4	1740
5/16	1515
3/8	1340
1/2	1115
5/8	945
3/4	825

Size Inches	No. Per Lb.
5/32 x 3/16	1130
1/4	990
3/8	800
1/2	665
5/8	570
3/4	500

COUNTERSUNK HEAD

Size Inches	No. Per Lb.
1/8 x 3/16	3250
1/4	2520
1/2	1400
5/32 x 1/4	1540
5/16	1300
3/16 x 3/8	750
1/2	595

Size Inches	No. Per Lb.
3/16 x 5/8	495
3/4	420
1	325
1/4 x 1/2	315
9/16	285
5/8	260
3/4	225
1	175

Size Inches	No. Per Lb.
1/4 x 1 1/4	143
1 1/2	120
5/16 x 1/2	190
3/4	140
1	110
1 1/4	91
1 1/2	77

Size Inches	No. Per Lb.
3/8 x 3/4	93
1	74
1 1/4	61
1 1/2	52
1/2 x 3/4	49
1	40
1 1/4	33
1 1/2	28

BUTTON HEAD

Size Inch	No. Per Lb.
1/4 x 5/8	190
3/4	170
1	140

OLD STYLE COUNTERSUNK

Size Inch	No. Per Lb.
1/4 x 5/8	260

Aluminum Rivets

Temper designation 2S

ROUND HEAD

Size Inches	No. Per Lb.
1/16 x 3/32	16120
1/8	12200
3/16	10950
1/4	9000
5/16	7600
3/8	5960
1/2	4800
3/32 x 3/16	4170
1/4	3540
5/16	3060
3/8	2650
1/2	2140

Size Inches	No. Per Lb.
1/8 x 3/16	2000
1/4	1740
5/16	1515
3/8	1340
1/2	1115
5/8	945
3/4	825
1	655

Size Inches	No. Per Lb.
5/32 x 3/16	1130
1/4	990
5/16	885
3/8	800
1/2	665
3/16 x 1/4	630
3/8	515
1/2	435
5/8	375
3/4	330
1	270
1 1/4	225

Size Inches	No. Per Lb.
1/4 x 1/2	215
5/8	190
3/4	170
1	140
1 1/4	118

FLAT HEAD

Size Inches	No. Per Lb.
3/32 x 3/16	4170
1/4	3540
5/16	3060
3/8	2650
1/2	2140

FLAT HEAD

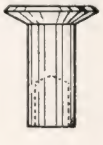
Size Inches	No. Per Lb.
1/8 x 1/4	1740
5/16	1515
3/8	1340
1/2	1115

Brass Rivets

CLUTCH FACING RIVETS—FULL TUBULAR

Specifications	Stand. Nos.	Our Old Nos.	Old Trade Numbers—Comparative Numbers of Other Manufacturers	Lengths	Box of 1000	Carton of 12/100	*Box of 100
 Body Dia. 1/8" Head Dia. 1/4"	1-5	105	26-5F-33-105-5	5/16"	$3.50	$4.80	$ .40
 Body Dia. 1/8" Head Dia. 5/16"	2-6	206	25-6G-18-615-32-206	6/16"	3.80	5.20	.44
 Body Dia. 9/64" Head Dia. 5/16"	3-3	303	738-2800-303-38-2-10	3/16"	$3.10	$4.30	$0.36
	3-4	304	738-2800-304-48-2-10	4/16"	3.20	4.40	.37
	3-5	305	738-2800-305-58-2-27-10	5/16"	3.30	4.50	.38
	3-6	306	738-2800-306-68-2-24-10	6/16"	3.50	4.80	.40
	3-7	307	738-2800-307-78-2-28-10	7/16"	3.90	5.30	.45
	3-8	308	738-2800-308-88-2-10	8/16"	4.20	5.70	.48
	3-10	310	738-2800-310-108-2-10	10/16"	4.90	6.80	.57

BRAKE RELINING RIVETS—SEMI-TUBULAR

Specifications	Stand. Nos.	Our Old Nos.	Old Trade Numbers—Comparative Numbers of Other Manufacturers		Lengths	Box of 1000	Carton of 12/100	*Box of 100
 Body Dia. 9/64" Head Dia. 5/16"	4-4	354	32-2561-2809-804	-11	4/16"	$3.00	$4.10	$0.35
	4-5	355	31-2561-2809-805	-11	5/16"	3.10	4.20	.35
	4-6	356	2561-2809-806	-11	6/16"	3.30	4.50	.38
	4-7	357	2561-2809-807	-11	7/16"	3.60	4.90	.41
	4-8	358	2561-2809	-11	8/16"	4.10	5.60	.47
 Body Dia. 9/64" Head Dia. 3/8"	5-4	404	2-2703-4A-41-12-404	-40	4/16"	3.40	4.60	.39
	5-5	405	7-2703-5A-51-12-405	-40	5/16"	3.50	4.80	.40
	5-6	406	10-2703-6A-61-12-406	-40	6/16"	3.80	5.20	.44
	5-7	407	2703-7A-71-12-407	-40	7/16"	4.20	5.70	.48
	5-8	408	15-2703-8A-81-12-408	-40	8/16"	4.40	6.00	.50
	5-10	410	13-2703-10A-101-12-4010	-40	10/16"	5.20	7.10	.60
	5-12	412	14-2703-12A-121-12-4012	-40	12/16"	6.00	8.30	.70
 Body Dia. 3/16" Head Dia. 3/8"	7-4	504	1-1681-4B-504-42-38	-30	4/16"	4.50	6.00	.50
	7-5	505	8-1681-5B-505-52-38	-30	5/16"	4.70	6.20	.52
	7-6	506	9-1681-6B-506-62-38	-30	6/16"	4.90	6.50	.55
	7-7	507	1681-7B-507-72-38	-30	7/16"	5.40	7.20	.60
	7-8	508	16-1681-8B-508-82-38	-30	8/16"	5.80	7.60	.64
	7-10	510	23-1681-10B-510-102-38	-30	10/16"	6.60	8.80	.74
	7-12	512	1681-12B-512-122-38	-30	12/16"	7.60	10.10	.85
 Body Dia. 3/16" Head Dia. 1/2"	8-6	706	3-6D-706-64-48	-90	6/16"	5.80	8.00	.67
	8-8	708	6-8D-708-84-48	-90	8/16"	6.60	9.10	.76
	8-10	710	11-10D-710-104-48	-90	10/16"	7.20	10.00	.84
	8-12	712	17-12D-712-124-48	-90	12/16"	8.20	11.30	.95
	8-14	714	19-14D-714-144-48	-90	14/16"	9.20	12.70	1.06
	8-16	716	21-16D-716-164-48	-90	16/16"	10.20	14.10	1.18
 Body Dia. 1/4" Head Dia. 1/2"	10-6	3506	1406-68-250		6/16"	11.30	15.40	1.29
	10-8	3508	35- 1408-68-250		8/16"	11.70	16.20	1.35
	10-10	3510	36- 1410-68-250		10/16"	12.30	17.10	1.43
	10-12	3512	37- 1412-68-250		12/16"	13.00	18.10	1.51
	10-16	3516	39- 1416-68-250		16/16"	14.30	19.90	1.66

SOLID COPPER AND SOLID ALUMINUM BRAKE BAND RIVETS—COUNTERSUNK HEAD

Packed in 1 lb. cartons

Stock No.	Head Diameter	Body Diameter	Overall Lengths							LIST PRICES PER LB. Copper	Aluminum
 12	1/4	1/8	3/8	1/2	5/8	3/4				$1.20	$2.78
10	9/32	9/64	3/8*	1/2*	5/8	3/4				1.13	2.43
9	5/16	5/32	3/8	1/2*	5/8*	3/4				1.09	2.15
8	3/8	11/64	3/8	1/2	5/8*	3/4*	1			1.06	2.08
7	13/32	3/16	3/8	1/2	5/8*	3/4*	1*			1.04	2.08
6	7/16	13/64		1/2	5/8	3/4*	1*			1.02	1.86
4	9/16	1/4				3/4*	1*	1 1/4*	1 1/2	1.02	1.72

*These sizes carried in stock. Other sizes made to order only.

Brass Rivets

SPLIT OR BIFURCATED BRASS RIVETS

Specifications	Stand. Nos.	Our Old Nos.	Old Trade Numbers—Comparative Numbers of Other Manufacturers		Lengths	Box of 1000	Carton of 12/100	*Box of 100
Body Dia. 9/64"	14-5	1205	2970-5200-905-9	-200-964	5/16"	$2.70	$3.70	$.31
	14-6	1206	2970-5200-906-9	-202-964	6/16"	2.90	4.00	.34
	14-7	1207	2970-5200-907-9	-203-964	7/16"	3.10	4.20	.35
	14-8	1208	2970-5200-908-9	-201-964	8/16"	3.30	4.50	.38
Head Dia. 5/16"	14-10	1210	2970-5200-910-9	-204-964	10/16"	4.10	5.60	.47
	14-12	1212	2970-5200-912-9	-964	12/16"	4.60	6.30	.53

ALUMINUM BRAKE RELINING RIVETS—SEMI-TUBULAR

When ordering, be sure to specify ALUMINUM—otherwise, brass will be furnished

Specifications	Stand. Nos.	Our Old Nos.	Old Trade Numbers—Comparative Numbers of Other Manufacturers		Lengths	Box of 1000	Carton of 12/100	*Box of 100
 Body Dia. 9/64"	4-4	1604	2812-304-48		4/16"	$3.00	$4.10	$.35
	4-5	1605	2812-305-58		5/16"	3.10	4.20	.35
	4-6	1606	2812-306-68		6/16"	3.30	4.50	.38
Head Dia. 5/16"	4-7	1607	2812-307-78		7/16"	3.60	4.90	.41
	4-8	1608	2812-308-88		8/16"	4.10	5.60	.47
 Body Dia. 9/64"	5-4	804	2-2811-4A-404-A416	-41	4/16"	3.40	4.60	.39
	5-5	805	7-2811-5A-405-A516	-51	5/16"	3.50	4.80	.40
	5-6	806	10-2811-6A-406-A616	-61	6/16"	3.80	5.20	.44
	5-7	807	2811-7A-407-A716	-71	7/16"	4.20	5.70	.48
Head Dia. 3/8"	5-8	808	15-2811-8A-408-A816	-81	8/16"	4.40	6.00	.50
	5-10	810	13-2811-10A-410-A1016	-101	10/16	5.20	7.10	.60
	5-12	812	14-2811-12A-412-A1216	-121	12/16"	6.00	8.30	.70
 Body Dia. 3/16"	7-4	904	1-2149-4B-504-B416	-42	4/16"	4.50	6.00	.50
	7-5	905	8-2149-5B-505-B516	-52	5/16"	4.70	6.20	.52
	7-6	906	9-2149-6B-506-B616	-62	6/16"	4.90	6.50	.55
	7-7	907	2149-7B-507-B716	-72	7/16"	5.40	7.20	.60
Head Dia. 3/8"	7-8	908	16-2149-8B-508-B816	-82	8/16"	5.80	7.60	.64
	7-10	910	23-2149-10B-510-B1016	-102	10/16"	6.60	8.80	.74
	7-12	912	2149-12B-512-B1216	-122	12/16"	7.60	10.10	.85

"National" Handy Riveter

This improved riveting machine will set both tubular and split (bifurcated) rivets perfectly. It automatically adjusts itself to the various lengths required. It is fully guaranteed as to workmanship and material.

The frame is of semisteel, accurately machined and finished in black enamel. The plunger and anvil are of hardened steel. The lever is of malleable iron. Height 6¾ in., 1¾ in. throat. The weight per each is 4½ lbs. Price, each **$1.00.**

Steel accessories including cap screws, cotters, wood screws, machine screws, nuts, stove bolts, etc., are our specialty. See index for listing elsewhere in this catalogue.

Silicon Bronze, the new metal that has superior corrosion resistant qualities as well as a very high tensil strength. Ask us about Silicon Bronze. See Index for Listing.

Our mill expert will be glad to help you or your engineers with any problem in Stainless Steel. Just ask for our Allegheny technical engineer.

A big stock of screws, rivets, nails, fittings, valves, bushings, and other accessories on hand for immediate shipment.

Steel Tubular and Split Rivets

For Harness, Strap, Leather, Canvas, and Similar Work

Body Diameter 9/64"

JAPANNED OR COPPERED TUBULAR RIVETS

Head Diameter 5/16"

ASSORTED LENGTHS

Per carton of 12 boxes of 50 Rivets 4/16" to 8/16" long $1.44
Per carton of 12 boxes of 100 Rivets 4/16" to 8/16" long 2.53
Per carton of 12 boxes of 50 Rivets 4/16" to 10/16" long 1.51
Per carton of 12 boxes of 100 Rivets 4/16" to 10/16" long 2.65

UNIFORM LENGTHS

Per Carton of 12 Boxes of 50 Rivets		Per Carton of 12 Boxes of 100 Rivets		Per Box of 1000 Rivets							
Length	**Price**	**Length**	**Price**	**Length**	**Price**	**Length**	**Price**	**Length**	**Price**	**Length**	**Price**
3/16"	$1.29	3/16"	$2.23	3/16"	$1.53	7/16"	$1.51	7/16"	$2.68	7/16"	$1.93
4/16"	1.36	4/16"	2.36	4/16"	1.63	8/16"	1.57	8/16"	2.79	8/16"	2.03
5/16"	1.42	5/16"	2.47	5/16"	1.73	9/16"	1.65	9/16"	2.91	9/16"	2.13
6/16"	1.47	6/16"	2.60	6/16"	1.83	10/16"	1.70	10/16"	3.02	10/16"	2.23

COPPERED OR JAPANNED SPLIT RIVETS

Body Diameter 9/64"

Head Diameter 5/16"

ASSORTED LENGTHS

Per carton of 12 boxes of 50 Rivets 4/16" to 8/16" long ..... $ .89
Per carton of 12 boxes of 100 Rivets 4/16" to 8/16" long 1.52

UNIFORM LENGTHS

Per Carton of 12 Boxes of 50 Rivets		Per Carton of 12 Boxes of 100 Rivets		Per Box of 1000 Rivets							
Length	**Price**	**Length**	**Price**	**Length**	**Price**	**Length**	**Price**	**Length**	**Price**	**Length**	**Price**
4/16"	$1.02	4/16"	$1.67	4/16"	$1.18	9/16"	$1.18	9/16"	$1.94	9/16"	$1.38
5/16"	1.02	5/16"	1.67	5/16"	1.18	10/16"	1.21	10/16"	2.00	10/16"	1.43
6/16"	1.06	6/16"	1.74	6/16"	1.23	11/16"	1.34	11/16"	2.07	11/16"	1.63
7/16"	1.09	7/16"	1.80	7/16"	1.28	12/16"	1.38	12/16"	2.13	12/16"	1.73
8/16"	1.12	8/16"	1.87	8/16"	1.33						

100,000 Rivets equal 167 cartons of 12 boxes of 50 Rivets

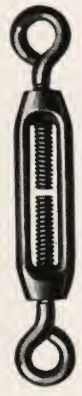
100,000 Rivets equal 84 cartons of 12 boxes of 100 Rivets

Tinners' Rivets

Countersunk Head—Tinned

Flat Head—Tinned—Black

Size	Length Under Head	Diameter Wire Gauge	List Tinned Pkge. of 1000 Price Per M	Bulk 100 Lbs.	List Black Pkge. of 1000 Price Per M	Bulk 100 Lbs.
8-oz.	5/32	13¼	$ .41	.....	$ .32	.....
10-oz.	11/64	13	.48	.....	.36	.....
12-oz.	3/16	12¼	.55	.....	.41	.....
14-oz.	3/16	12	.61	.....	.45	.....
1 lb.	13/64	11¾	.67	$59.50	.48	$41.00
1¼ lb.	7/32	11	.77	.....	.54	.....
1½ lb.	15/64	10¼	.90	52.50	.62	34.00
1¾ lb.	¼	10	.99	.....	.67	.....
2 lb.	17/64	9¼	1.09	47.50	.72	29.00
2½ lb.	9/32	9	1.29	44.50	.83	26.00
3 lb.	5/16	8¼	1.52	43.50	.96	25.00
3½ lb.	21/64	8	1.74	42.50	1.09	24.00
4	11/32	7¼	1.94	41.50	1.20	23.00
5	3/8	6¾	2.23	40.50	1.30	22.00
6	25/64	6	2.61	39.50	1.50	21.00
7	13/32	5¼	3.05.	39.50	1.75	21.00
8	7/16	4¾	3.48	39.50	2.00	21.00
9	29/64	4¼	3.87	.....	2.20	.....
10	15/32	4	4.25	38.50	2.40	20.00
12	½	3	4.86	36.50	2.64	18.00
14	33/64	2	5.67	36.50	3.08	18.00
16	17/32	1	6.48	36.50	3.52	18.00



Bronze Turnbuckles

List Prices

No.	Length Overall	Screw Size	Plain Dozen	No.	Polished Dozen
11	2 7/16	1/8	$ 2.00	....	.....
21	3 3/16	5/32	2.60	....	.....
31	4	3/16	3.40	32	$ 4.80
41	4 1/2	7/32	4.20	42	5.80
51	5 1/4	1/4	5.10	52	7.00
61	6	5/16	7.20	62	9.80
71	6 7/8	3/8	12.00	72	15.00
81	7 5/8	7/16	16.00	82	20.00

Bronze turnbuckles are of very fine material and are well suited for marine use. The hardware trades also handle the smaller sizes with good success.

Steel Turnbuckles

SMALL TURNBUCKLES

List Prices

No.	Finish	Screw Size	Length Closed	Take Up	Weight Gross	List Per Gross
24	Galvanized	3/16	3	1 1/2	12 lb.	$13.00
34	Galvanized	3/16	4	1 7/8	15 lb.	15.00
44	Galvanized	7/32	4 1/2	2 1/4	18 lb.	18.00
25	Nickel Plated	3/16	3	1 1/2	12 lb.	12.00
35	Nickel Plated	3/16	4	1 7/8	15 lb.	13.50
45	Nickel Plated	7/32	4 1/2	2 1/4	18 lb.	16.00

These turnbuckles are exceptionally well made and proportioned. The bodies are large size and the steel screw eyes fit well. A high grade of finish is maintained. When desired these may be furnished not finished or in any other finish required to order.

LARGE TURNBUCKLES

(Hardware Type)

List Prices

No.	Finish	Screw Size	Length Closed	Take Up	Weight Gross	List Per Dozen
53	Plain	1/4	5 1/4	2 5/8	2.2	$2.30
63	Plain	5/16	6	3	3.8	2.90
73	Plain	3/8	6 7/8	3 1/2	6.	4.40
54	Galvanized	1/4	5 1/4	2 5/8	2.2	2.70
64	Galvanized	5/16	6	3	3.8	3.40
74	Galvanized	3/8	6 7/8	3 1/2	6.	5.00
84	Galvanized	7/16	7 5/8	4	9.5	6.80
55	Nickel Plated	1/4	5 1/4	2 5/8	2.2	2.70
65	Nickel Plated	5/16	6	3	3.8	3.40

These turnbuckles are ideal for general hardware use as they are strong for their size and comparatively inexpensive.

Small Eye Bolts

List Price per Hundred

Size	Length of Thread	Plain	Galvanized
10-24	1 1/4	$ 4.00	$ 5.00
12-24	1 1/2	5.00	6.00
1/4-20	1 3/4	6.50	8.00
5/16-18	2	9.00	10.00
3/8-16	2 1/4	12.00	13.50

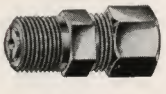
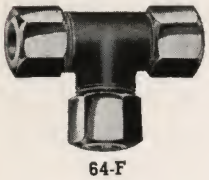
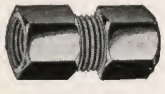
Made of steel with hex nuts. A very strong and well made eye bolt for general use. Special sizes made to order in quantities of 3000 or more.

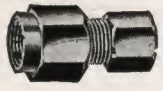
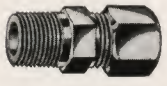
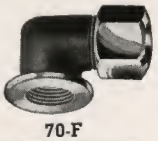
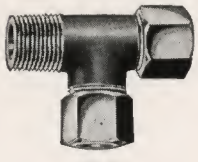
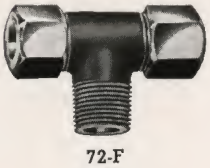
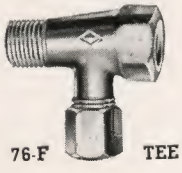
IMPERIAL
Fittings and Parts

INDEX

Imperial Compression Fittings

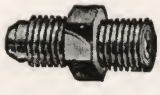
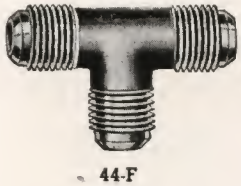
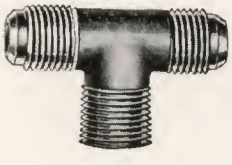
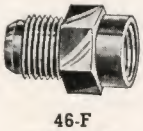
For connecting Brass, Copper, Aluminum, Shelby or Bundy Tubing.

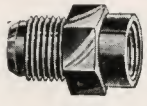
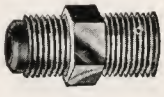
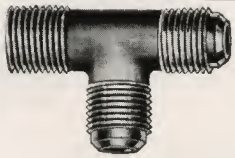
Imperial Numbers and Description	O. D. of Tube	Iron Pipe Size	Standard Package Quantity	Price Per 100 Including Nuts & Sleeves
 60-F SLEEVE	1/8	....	100	$ 2.00
	5/32	....	100	2.50
	3/16	....	100	2.00
	1/4	....	100	2.00
	5/16	....	100	2.50
	3/8	....	100	3.50
	7/16	....	25	6.50
	1/2	....	25	10.50
	5/8	....	....	14.50
	3/4	....	....	21.00
 61-F NUT	1/8	....	25	5.00
	5/32	....	25	7.00
	3/16	....	25	5.50
	1/4	....	50	6.00
	5/16	....	50	8.00
	3/8	....	25	10.00
	7/16	....	25	18.00
	1/2	....	25	21.00
	5/8	....	....	31.00
	3/4	....	....	38.50
 62-F UNION	1/8	....	15	22.00
	5/32	....	15	28.00
	3/16	....	15	23.00
	1/4	....	25	25.00
	5/16	....	25	31.00
	3/8	....	15	39.00
	7/16	....	10	73.00
	1/2	....	10	95.00
	5/8	....	....	145.00
	3/4	....	....	209.00
 63-F CHECK VALVE CONNECTOR	1/8	1/8	15	30.00
	3/16	1/8	15	32.00
	1/4	1/8	15	36.00
	5/16	1/8	15	39.00
	3/8	1/4	15	52.00
	1/2	3/8	10	123.00
 64-F TEE	1/8	....	15	39.00
	3/16	....	15	40.00
	1/4	....	25	44.00
	5/16	....	25	48.00
	3/8	....	15	66.00
	7/16	....	10	120.00
	1/2	....	10	180.00
	5/8	....	....	251.00
	3/4	....	....	351.00
 65-F ELBOW UNION	1/8	....	15	33.00
	3/16	....	15	35.00
	1/4	....	25	36.00
	5/16	....	25	45.00
	3/8	....	15	48.00
	7/16	....	10	87.00
	1/2	....	10	106.00
	5/8	....	....	190.00
	3/4	....	....	242.00
 66-F FEMALE CONNECTOR	1/8	1/8	15	17.00
	3/16	1/8	15	18.00
	1/4	1/8	15	20.00
	5/16	1/8	15	22.00
	3/8	1/8	15	34.00
	1/2	3/8	10	86.00
	5/8	1/2	....	114.00
	3/4	1/2	....	176.00

Imperial Numbers and Description	O. D. of Tube	Iron Pipe Size	Standard Package Quantity	Price Per 100 Including Nuts & Sleeves
 67-F FEMALE COUPLING	3/16	1/4	15	$ 32.00
	1/4	1/4	15	32.00
	5/16	1/4	15	40.00
	3/8	1/4	15	42.00
	7/16	1/4	10	72.00
	5/8	1/2	....	114.00
	3/4	1/2	....	176.00
 68-F MALE CONNECTOR	1/8	1/8	25	14.00
	3/16	1/8	25	15.00
	1/4	1/8	50	17.00
	1/4	1/4	25	22.00
	5/16	1/8	50	20.00
	5/16	1/4	25	25.00
	3/8	1/8	15	31.00
	3/8	1/4	15	34.00
	7/16	1/4	10	60.00
	1/2	3/8	10	73.00
	5/8	1/2	....	94.00
	3/4	1/2	....	135.00
 69-F MALE ELBOW CONNECTOR	1/8	1/8	25	24.00
	3/16	1/8	25	25.00
	1/4	1/8	50	26.00
	1/4	1/4	25	31.00
	5/16	1/8	50	32.00
	5/16	1/4	25	33.00
	3/8	1/8	15	46.00
	3/8	1/4	15	51.00
	7/16	1/4	10	92.00
	1/2	3/8	10	109.00
	5/8	1/2	....	152.00
	3/4	1/2	....	198.00
 70-F FEMALE ELBOW CONNECTOR	1/8	1/8	15	22.00
	3/16	1/8	15	25.00
	1/4	1/8	25	28.00
	5/16	1/8	25	34.00
	3/8	1/4	15	40.00
	7/16	1/4	10	73.00
	1/2	3/8	10	101.00
 71-F TEE	1/8	1/8	15	32.00
	3/16	1/8	15	34.00
	1/4	1/8	15	40.00
	5/16	1/8	15	44.00
	3/8	1/4	15	57.00
	7/16	1/4	5	104.00
	1/2	3/8	5	158.00
	5/8	1/2	....	207.00
	3/4	1/2	....	280.00
 72-F TEE	1/8	1/8	15	32.00
	3/16	1/8	15	34.00
	1/4	1/8	15	40.00
	5/16	1/8	15	44.00
	3/8	1/4	15	57.00
	7/16	1/4	5	104.00
	1/2	3/8	5	158.00
	5/8	1/2	....	210.00
	3/4	1/2	....	280.00
 76-F TEE		Male and Female		
	1/8	1/8	25	40.00
	3/16	1/8	25	44.00
	1/4	1/8	15	48.00
	5/16	1/8	15	53.00

Imperial S. A. E. (Flared) Fittings

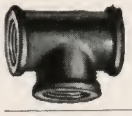
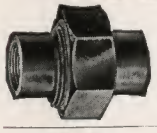
For Connecting Brass and Copper Tubing

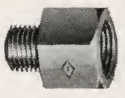
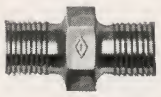
Imperial Numbers and Descriptions	O. D. of Tube	Iron Pipe Thread	Standard Package Quantity	List Price Per 100 Without Nuts
 41-F STANDARD UNION NUT	1/8	....	15	$ 10.00
	3/16	....	25	11.00
	1/4	....	50	13.00
	5/16	....	50	17.00
	3/8	....	25	25.00
	7/16	....	10	34.00
	1/2	....	10	46.00
	5/8	....	....	74.00
	3/4	....	....	101.00
 41-F SHORT UNION NUT	1/8	....	15	9.00
	3/16	....	25	10.00
	1/4	....	50	12.00
	5/16	....	50	15.00
	3/8	....	25	22.00
	7/16	....	10	34.00
	1/2	....	10	40.00
	5/8	....	....	68.00
	3/4	....	....	95.00
 42-F UNION	1/8	....	10	17.00
	3/16	....	25	18.00
	1/4	....	25	19.00
	5/16	....	25	23.00
	3/8	....	25	35.00
	7/16	....	10	45.00
	1/2	....	10	55.00
	5/8	....	....	92.00
	3/4	....	....	130.00
 43-F CHECK VALVE CONNECTOR	1/8	1/8	10	29.00
	3/16	1/8	10	30.00
	1/4	1/8	25	31.00
	5/16	1/8	25	35.00
	3/8	1/4	25	48.00
	7/16	1/4	10	57.00
	1/2	3/8	10	68.00
 44-F TEE	1/8	....	10	23.00
	3/16	....	10	24.00
	1/4	....	15	26.00
	5/16	....	15	33.00
	3/8	....	15	52.00
	7/16	....	10	70.00
	1/2	....	10	79.00
	5/8	....	....	235.00
	3/4	....	....	272.00
 45-F TEE	1/8	1/8	10	22.00
	3/16	1/8	10	23.00
	1/4	1/8	15	25.00
	5/16	1/8	15	32.00
	3/8	1/4	15	52.00
	7/16	1/4	10	75.00
	1/2	3/8	10	88.00
	5/8	1/2	....	226.00
	3/4	1/2	....	255.00
 46-F FEMALE COUPLING	1/8	1/8	15	15.00
	3/16	1/8	15	16.00
	1/4	1/8	25	17.00
	5/16	1/8	25	20.00
	3/8	1/4	25	32.00
	7/16	1/4	10	43.00
	1/2	3/8	10	52.00
	5/8	1/2	....	112.00
	3/4	1/2	....	165.00

Imperial Numbers and Descriptions	O. D. of Tube	Iron Pipe Thread	Standard Package Quantity	List Price Per 100 Without Nuts
 47-F FEMALE COUPLING	1/4	1/4	15	$ 24.00
	5/16	1/4	15	26.00
	3/8	3/8	15	51.00
	7/16	3/8	10	55.00
	1/2	1/2	10	73.00
 48-F MALE CONNECTOR	1/8	1/8	25	11.00
	3/16	1/8	15	12.00
	1/4	1/8	50	13.00
	1/4	1/4	25	22.00
	5/16	1/8	50	17.00
	5/16	1/4	25	24.00
	3/8	1/4	25	35.00
	3/8	1/8	25	32.00
	7/16	1/4	10	38.00
	1/2	3/8	10	45.00
	5/8	1/2	....	90.00
	3/4	1/2	....	100.00
 49-F MALE ELBOW CONNECTOR	1/8	1/8	15	18.00
	3/16	1/8	15	19.00
	1/4	1/8	50	20.00
	1/4	1/4	25	29.00
	5/16	1/8	50	23.00
	5/16	1/4	25	35.00
	3/8	1/8	25	41.00
	3/8	1/4	25	44.00
	7/16	1/4	10	52.00
	1/2	3/8	10	60.00
	5/8	1/2	....	140.00
	3/4	1/2	....	190.00
 50-F FEMALE ELBOW CONNECTOR	1/8	1/8	10	24.00
	3/16	1/8	10	24.00
	1/4	1/8	25	25.00
	5/16	1/8	25	28.00
	3/8	1/4	15	61.00
	7/16	1/4	10	85.00
	1/2	3/8	10	113.00
	5/8	1/2	....	172.00
 51-F TEE	1/8	1/8	10	24.00
	3/16	1/8	10	25.00
	1/4	1/8	15	27.00
	5/16	1/8	15	33.00
	3/8	1/4	15	50.00
	7/16	1/4	10	74.00
	1/2	3/8	10	81.00
	5/8	1/2	....	226.00
	3/4	1/2	....	254.00
 55-F ELBOW UNION	1/8	....	10	22.00
	3/16	....	10	23.00
	1/4	....	25	24.00
	5/16	....	25	25.00
	3/8	....	15	37.00
	7/16	....	10	51.00
	1/2	....	10	55.00
	5/8	....	....	136.00
	3/4	....	....	156.00
 56-F TEE		Male and Female		
	1/8	1/8	25	36.00
	3/16	1/8	25	37.00
	1/4	1/8	15	39.00
	5/16	1/8	15	42.00

Same: No. 76-F in Compression

Imperial Brass Pipe Fittings

Imperial Numbers and Descriptions	Size	Standard Package Quantity	Price Per 100
 100-B ELBOW	⅛	25	$ 19.00
	¼	15	27.00
	⅜	10	54.00
	½	5	86.00
 101-B TEE	⅛	25	27.00
	¼	15	37.00
	⅜	10	60.00
	½	5	110.00
 102-B CROSS	⅛	15	42.00
	¼	15	51.00
	⅜	5	77.00
	½	5	118.00
 103-B COUPLING	⅛	25	17.00
	¼	15	29.00
	⅜	15	43.00
	½	10	76.00
 104-B UNION	⅛	10	73.00
	¼	10	103.00
	⅜	5	118.00
	½	....	153.00
 108-B CAP	⅛	15	16.00
	¼	15	22.00
	⅜	10	31.00
	½	10	46.00
 109-B PLUG	⅛	50	11.00
	¼	25	16.00
	⅜	15	25.00
	½	15	29.00
 110-B BUSHING	¼x⅛	50	14.00
	⅜x⅛	15	20.00
	⅜x¼	25	20.00
	½x⅜	15	30.00
	½x⅛	15	30.00
	½x¼	15	30.00
 111-B LOCK-NUT	⅛	25	13.00
	¼	15	15.00
	⅜	15	24.00
	½	15	31.00

Imperial Numbers and Descriptions	Size	Standard Package Quantity	Price Per 100
 112-B CLOSE NIPPLE	⅛	25	$13.00
	¼	15	18.00
	⅜	15	30.00
	½	15	43.00
 116-B STREET ELBOW	⅛	25	21.00
	¼	15	29.00
	⅜	15	48.00
	½	10	65.00
 117-B SLOTTED PLUG	⅛	50	9.00
	¼	25	13.75
	⅜	....	18.00
	½	....	22.00
 118-B WING PLUG	⅛	25	20.00
	¼	15	23.00
	⅜	15	30.00
 119-B REDUCING COUPLING	¼x⅛	25	23.00
	⅜x¼	15	34.00
	½x⅜	15	44.00
 120-B ADAPTER	⅛x⅛	25	21.00
	¼x⅛	25	23.00
	⅜x¼	15	34.00
	½x⅜	15	44.00
 121-B PLUG	⅛	25	13.00
	¼	25	16.00
	⅜	15	22.00
	½	15	33.00
 122-B HEX NIPPLE	⅛x⅛	10	15.00
	¼x¼	10	20.00
	⅜x⅜	5	42.00
	½x½	....	61.00
 123-B REDUCING NIPPLE	¼x⅛	25	23.00
	⅜x¼	15	34.00

113-B  LONG NIPPLE

Size	Length	Standard Package Quantity	Price Per 100
⅛	1½	25	$18.00
¼	1½	15	24.00
⅜	1½	15	32.00
½	1½	10	50.00
⅛	2	25	22.00
¼	2	15	29.00
⅜	2	15	33.00
½	2	10	55.00
⅛	2½	25	25.00
¼	2½	15	33.00
⅜	2½	15	42.00
½	2½	10	62.00
⅛	3	25	27.00
¼	3	15	36.00
⅜	3	15	50.00
½	3	10	68.00

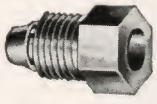
Size	Length	Standard Package Quantity	Price Per 100
⅛	3½	25	$32.00
¼	3½	15	41.00
⅜	3½	10	56.00
½	3½	10	75.00
⅛	4	15	36.00
¼	4	10	47.00
⅜	4	5	62.00
½	4	5	79.00
⅛	4½	15	39.00
¼	4½	10	57.00
⅜	4½	5	68.00
½	4½	5	87.00
⅛	5	15	42.00
¼	5	10	62.00
⅜	5	5	75.00
½	5	5	95.00

Imperial Light Hi-Duty Fittings & Imperial Heavy Hi-Duty Fittings

For Copper, Shelby, Aluminum, Bundy, Bundyweld, Everdur, Duronze, Stainless Steel and Steel Tubing.

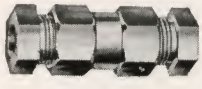
"L" Denotes Standard Hi-Duty **"H"** Denotes Heavy Hi-Duty

For Automobiles, Trucks, Tractors, Buses, Marine Engines, Oil Burners, Air Compressors, Airplanes, Machine Tools wherever Tubing is used.



81-L and 81-H NUT

O D. Tube	Size I. P. Thread	Std. Pkg. Quantity	Price Per 100
L 1/8	....	25	$ 7.70
L 3/16	....	25	8.25
L 1/4	....	50	10.30
L 5/16	....	50	12.40
L 3/8	....	25	18.70
L 7/16	....	12	27.25
L 1/2	....	12	33.45
H 5/8	....	....	50.00
H 3/4	....	....	60.00
H 7/8	....	....	75.00
H 1	....	....	90.00

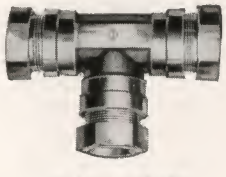


82-L and 82-H UNION

L 1/8	....	15	35.50
L 3/16	....	15	36.50
L 1/4	....	25	43.45
L 5/16	....	25	53.10
L 3/8	....	15	69.50
L 7/16	....	10	79.35
L 1/2	....	10	110.95
H 5/8	....	....	182.00
H 3/4	....	....	228.00
H 7/8	....	....	275.00
H 1	....	....	318.00

83-L BALL CHECK VALVE

L 1/8	1/8	15	34.10
L 3/16	1/8	15	35.20
L 1/4	1/8	15	38.50
L 5/16	1/8	15	44.00
L 3/8	1/4	15	57.20
L 7/16	1/4	10	77.00
L 1/2	3/8	10	132.00

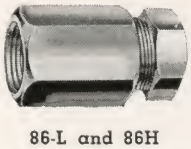


84-L and 84-H TEE

L 1/8	....	15	51.15
L 3/16	....	15	52.80
L 1/4	....	15	59.15
L 5/16	....	15	74.95
L 3/8	....	15	104.50
L 7/16	....	5	136.40
L 1/2	....	5	176.00
H 5/8	....	....	285.00
H 3/4	....	....	365.00
H 7/8	....	....	445.00
H 1	....	....	512.00

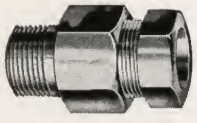
85-L and 85-H ELBOW

L 1/8	....	15	41.80
L 3/16	....	15	42.90
L 1/4	....	15	45.05
L 5/16	....	15	51.50
L 3/8	....	15	72.05
L 7/16	....	10	99.55
L 1/2	....	10	121.00
H 5/8	....	....	175.00
H 3/4	....	....	218.00
H 7/8	....	....	270.00
H 1	....	....	318.00



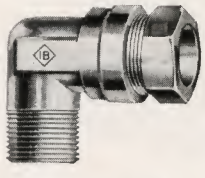
86-L and 86H FEMALE COUPLING

L 1/8	1/8	15	30.60
L 3/16	1/8	15	31.00
L 1/4	1/8	15	33.00
L 5/16	1/8	15	39.80
L 3/8	1/4	15	49.90
L 7/16	1/4	10	71.70
L 1/2	3/8	10	105.40
H 5/8	1/2	....	116.00
H 3/4	3/4	....	150.00
H 7/8	3/4	....	176.00
H 1	1	....	205.00



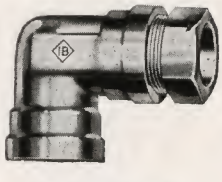
88-L and 88-H CONNECTOR

O D. Tube	Size I. P. Thread	Std. Pkg. Quantity	Price Per 100
L 1/8	1/8	25	$15.40
L 3/16	1/8	25	17.95
L 1/4	1/8	50	20.55
L 1/4	1/4	25	25.30
L 5/16	1/8	50	25.30
L 5/16	1/4	25	31.70
L 3/8	1/4	15	38.95
L 7/16	1/4	10	61.60
L 1/2	3/8	10	81.40
H 5/8	1/2	....	115.00
H 3/4	3/4	....	145.00
H 7/8	3/4	....	170.00
H 1	1	....	198.00



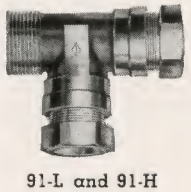
89-L and 89-H ELBOW

L 1/8	1/8	25	24.20
L 3/16	1/8	25	25.85
L 1/4	1/8	50	28.35
L 1/4	1/4	25	33.55
L 5/16	1/8	50	33.55
L 5/16	1/4	25	37.95
L 3/8	1/4	15	52.95
L 7/16	1/4	10	69.30
L 1/2	3/8	10	94.15
H 5/8	1/2	....	118.00
H 3/4	3/4	....	150.00
H 7/8	3/4	....	178.00
H 1	1	....	200.00



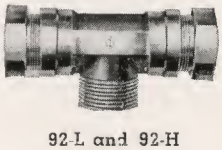
90-L and 90-H ELBOW

L 1/8	1/8	15	27.50
L 3/16	1/8	15	29.70
L 1/4	1/8	25	32.45
L 5/16	1/8	25	40.70
L 3/8	1/4	15	59.85
L 7/16	1/4	10	99.85
L 1/2	3/8	10	126.50
H 5/8	1/2	....	135.00
H 3/4	3/4	....	168.00
H 7/8	3/4	....	200.00
H 1	1	....	236.00



91-L and 91-H TEE

L 1/8	1/8	15	38.50
L 3/16	1/8	15	40.70
L 1/4	1/8	25	45.30
L 5/16	1/8	25	61.05
L 3/8	1/4	15	88.00
L 7/16	1/4	5	121.00
L 1/2	3/8	5	165.00
H 5/8	1/2	....	240.00
H 3/4	3/4	....	305.00
H 7/8	3/4	....	372.00
H 1	1	....	425.00



92-L and 92-H TEE

L 1/8	1/8	15	38.50
L 3/16	1/8	15	40.70
L 1/4	1/8	25	45.30
L 5/16	1/8	25	61.05
L 3/8	1/4	15	88.00
L 7/16	1/4	5	121.00
L 1/2	3/8	5	165.00
H 5/8	1/2	....	240.00
H 3/4	3/4	....	305.00
H 7/8	3/4	....	372.00
H 1	1	....	425.00

94-L and 94-H 45° ELBOW

L 1/8	1/8	15	28.05
L 3/16	1/8	15	28.35
L 1/4	1/8	15	30.80
L 5/16	1/8	15	43.20
L 3/8	1/4	15	55.00
L 7/16	1/4	5	71.50
L 1/2	3/8	5	96.80
H 5/8	1/2	....	121.00
H 3/4	3/4	....	150.00
H 7/8	3/4	....	180.00
H 1	1	....	210.00

1/8 to 1/2 May be had in Heavy Hi-Duty from factory, some sizes available from local stock.

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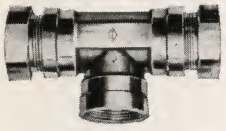
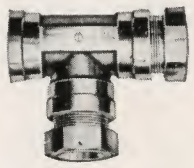
Imperial Light Hi-Duty Fittings & Imperial Heavy Hi-Duty Fittings

(Continued from preceding page)



95-L and 95-H TEE

O. D. Tube	Size I. P. Thread	Std. Pkg. Quantity	Price Per 100
L 1/8	1/8	15	$44.00
L 3/16	1/8	15	45.65
L 1/4	1/8	15	50.05
L 5/16	1/8	15	66.00
L 3/8	1/4	15	92.40
L 7/16	1/4	5	126.50
L 1/2	3/8	5	170.50
H 5/8	1/2	....	240.00
H 3/4	3/4	....	305.00
H 7/8	3/4	....	372.00
H 1	1	....	425.00

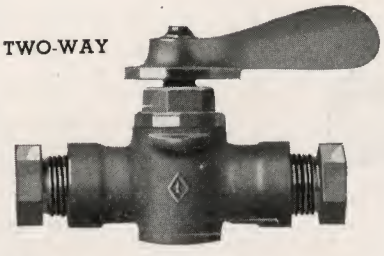


96-L and 96-H TEE

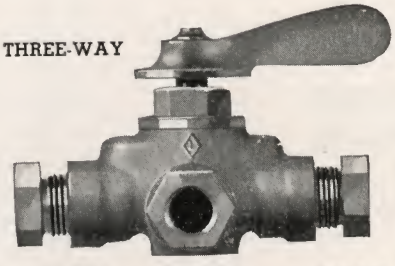
O. D. Tube	Size I. P. Thread	Std. Pkg. Quantity	Price Per 100
L 1/8	1/8	15	$44.00
L 3/16	1/8	15	45.65
L 1/4	1/8	15	50.05
L 5/16	1/8	15	66.00
L 3/8	1/4	15	92.40
L 7/16	1/4	5	126.50
L 1/2	3/8	5	170.50
H 5/8	1/2	....	240.00
H 3/4	3/4	....	305.00
H 7/8	3/4	....	372.00
H 1	1	....	425.00

Imperial Hi-Duty Shut-off Cocks

TWO-WAY



THREE-WAY



Catalog No.	Tube Size Outside Diameter	Male Iron Pipe Thread	Female Iron Pipe Thread	List Price Each
100-HD	1/8 "x1/8 "	.....	.....	$1.65
100-HD	3/16"x3/16"	.....	.....	1.70
100-HD	1/4 "x1/4 "	.....	.....	1.75
100-HD	5/16"x5/16"	.....	.....	1.85
100-HD	3/8 "x3/8 "	.....	.....	2.00
100-HD	1/2 "x1/2 "	.....	.....	2.60
*101-HD	1/8 "	1/8 "	.....	1.60
*101-HD	3/16"	1/8 "	.....	1.65
101-HD	1/4 "	1/8 "	.....	1.70
101-HD	1/4 "	1/4 "	.....	1.75
101-HD	5/16"	1/8 "	.....	1.75
101-HD	5/16"	1/4 "	.....	1.80
101-HD	3/8 "	1/4 "	.....	1.85
*101-HD	1/2 "	3/8 "	.....	2.40
102-HD	.....	1/8 "x1/8 "	.....	1.70
102-HD	.....	1/4 "x1/4 "	.....	1.75
*102-HD	.....	3/8 "x3/8 "	.....	1.90
103-HD	.....	1/8 "	1/8 "	1.70
103-HD	.....	1/4 "	1/4 "	1.85
*103-HD	.....	3/8 "	3/8 "	2.55
104-HD	.....	.....	1/8 "x1/8 "	1.70
104-HD	.....	.....	1/4 "x1/4 "	1.85
*104-HD	.....	.....	3/8 "x3/8 "	2.55

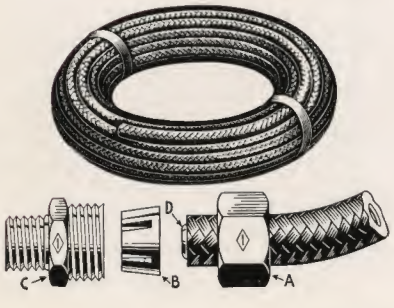
*Made to Order.

Catalog No.	Tube Size Outside Diameter	Male Iron Pipe Thread	Female Iron Pipe Thread	List Price Each
105-HD	1/8 "x1/8 "x1/8 "	.....	.....	$2.10
105-HD	3/16"x3/16"x3/16"	.....	.....	2.20
105-HD	1/4 "x1/4 "x1/4 "	.....	.....	2.35
105-HD	5/16"x5/16"x5/16"	.....	.....	2.50
105-HD	3/8 "x3/8 "x3/8 "	.....	.....	2.75
105-HD	1/2 "x1/2 "x1/2 "	.....	.....	4.00
*106-HD	1/8 "x1/8 "	1/8 "	.....	2.05
*106-HD	3/16"x3/16"	1/8 "	.....	2.15
*106-HD	1/4 "x1/4 "	1/8 "	.....	2.25
*106-HD	1/4 "x1/4 "	1/4 "	.....	2.35
*106-HD	5/16"x5/16"	1/8 "	.....	2.40
*106-HD	5/16"x5/16"	1/4 "	.....	2.45
*106-HD	3/8 "x3/8 "	1/4 "	.....	2.60
*106-HD	1/2 "x1/2 "	3/8 "	.....	3.70
*107-HD	1/8 "x1/8 "	.....	1/8 "	2.30
*107-HD	3/16"x3/16"	.....	1/8 "	2.35
*107-HD	1/4 "x1/4 "	.....	1/8 "	2.40
*107-HD	1/4 "x1/4 "	.....	1/4 "	2.60
*107-HD	5/16"x5/16"	.....	1/8 "	2.45
*107-HD	5/16"x5/16"	.....	1/4 "	2.65
*107-HD	3/8 "x3/8 "	.....	1/4 "	2.75
*107-HD	1/2 "x1/2 "	.....	3/8 "	3.80
*108-HD	.....	.....	1/8 "x1/8 "x1/8 "	2.20
*108-HD	.....	.....	1/4 "x1/4 "x1/4 "	2.50
*108-HD	.....	.....	3/8 "x3/8 "x3/8 "	3.75
*109-HD	.....	1/8 "x1/8 "x1/8 "	.....	2.15
*109-HD	.....	1/4 "x1/4 "x1/4 "	.....	2.40
*109-HD	.....	3/8 "x3/8 "x3/8 "	.....	3.50

*Made to Order.
In ordering, first specify left end, then right, and branch last.

Imperial Flexible Tubing and Couplings

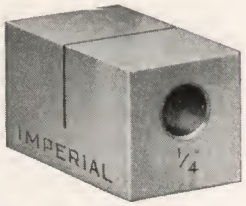
Tubing furnished in coils to replace copper lines for gas, oil and air, in any length.



FLEXIBLE TUBING WITH BRASS METAL INNNER CORE

In Coils—25 and 50 Feet

No.	Copper Tube Equivalent	List Price Per Foot
13-FT	1/4 " O. D.	$0.40
14-FT	5/16" O. D.	.42
15-FT	3/8 " O. D.	.45
13-FT	1/2 " O. D.	.70



No. 194-Ft. Cutting Block

No. 194-FT. Cutting Block for each of above sizes, $.75 each.

Imperial Flexible Tubing and Couplings

Imperial Flexible Tube Couplings are for use with Imperial Flexible Tubing. They make a tight leakproof connection and are furnished in a variety of styles to take ¼", 5/16", ⅜" and ½" flexible tubing. These couplings are adaptable for practically every type of joint that occurs in gas, oil and air line assemblies. Flexible tubing connection on one end, and the other end can be furnished for either compression, flared, inverted flare, Hi-Duty or iron pipe thread in male or female and in straight or elbow types.

In addition to the ease of assembly to flexible tubing the couplings can be detached and used over again.

The prices listed below cover parts complete with nut, sleeve and grommet.

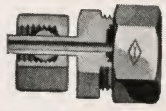
INVERTED NUT TO HOSE

Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-213	3/16"	13-FT	$28.50-C
F-214	¼ "	13-FT	28.50-C
F-215	5/16"	14-FT	34.00-C
F-216	⅜ "	15-FT	45.00-C
F-218	½ "	16-FT	80.00-C

S.A.E. NUT TO HOSE

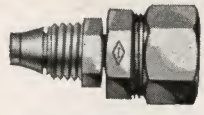
Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-413	3/16"	13-FT	$28.50-C
F-414	¼ "	13-FT	32.00-C
F-415	5/16"	14-FT	36.25-C
F-416	⅜ "	15-FT	55.00-C
F-418	½ "	16-FT	85.00-C

COMPRESSION NUT TO HOSE



Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-613	3/16"	13-FT	$30.00-C
F-614	¼ "	13-FT	30.00-C
F-615	5/16"	14-FT	35.00-C
F-616	⅜ "	15-FT	52.50-C
F-618	½ "	16-FT	85.00-C

HI-DUTY NUT TO HOSE



Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-813	3/16"	13-FT	$30.00-C
F-814	¼ "	13-FT	30.00-C
F-815	5/16"	14-FT	35.00-C
F-816	⅜ "	15-FT	55.00-C
F-818	½ "	16-FT	85.00-C

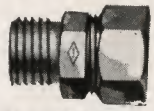
INVERTED CONNECTOR TO HOSE

Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-283	3/16"	13-FT	$32.50-C
F-284	¼ "	13-FT	32.50-C
F-285	5/16"	14-FT	35.00-C
F-286	⅜ "	15-FT	50.00-C
F-288	½ "	16-FT	75.00-C

S.A.E. CONNECTOR TO HOSE

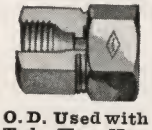
Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-483	3/16"	13-FT	$27.50-C
F-484	¼ "	13-FT	29.00-C
F-485	5/16"	14-FT	30.00-C
F-486	⅜ "	15-FT	50.00-C
F-488	½ "	16-FT	80.00-C

COMPRESSION CONNECTOR TO HOSE



Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-683	3/16"	13-FT	$27.50-C
F-684	¼ "	13-FT	28.50-C
F-685	5/16"	14-FT	30.00-C
F-686	⅜ "	15-FT	45.00-C
F-688	½ "	16-FT	80.00-C

HI-DUTY CONNECTOR TO HOSE



Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-883	3/16"	13-FT	$27.50-C
F-884	¼ "	13-FT	28.50-C
F-885	5/16"	14-FT	30.00-C
F-886	⅜ "	15-FT	47.50-C
F-888	½ "	16-FT	80.00-C

INVERTED ELBOW TO HOSE

Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-293	3/16"	13-FT	$35.00-C
F-294	¼ "	13-FT	35.00-C
F-295	5/16"	14-FT	37.50-C
F-296	⅜ "	15-FT	70.00-C
F-298	½ "	16-FT	110.00-C

S.A.E. ELBOW TO HOSE

Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-493	3/16"	13-FT	$30.00-C
F-494	¼ "	13-FT	32.50-C
F-495	5/16"	14-FT	35.00-C
F-496	⅜ "	15-FT	75.00-C
F-498	½ "	16-FT	115.00-C

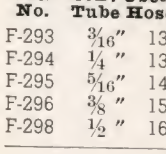
COM-PRESSION ELBOW TO HOSE

Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-693	3/16"	13-FT	$32.50-C
F-694	¼ "	13-FT	32.50-C
F-695	5/16"	14-FT	35.00-C
F-696	⅜ "	15-FT	75.00-C
F-698	½ "	16-FT	115.00-C

HI-DUTY ELBOW TO HOSE

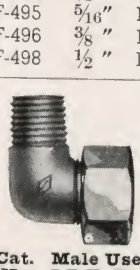
Cat. No.	O.D. Tube	Used with Hose No.	List Price
F-893	3/16"	13-FT	$30.00-C
F-894	¼ "	13-FT	30.00-C
F-895	5/16"	14-FT	32.50-C
F-896	⅜ "	15-FT	75.00-C
F-898	½ "	16-FT	115.00-C

MALE IRON PIPE THREAD TO HOSE



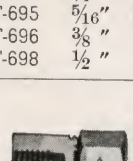
Cat. No.	Male I.P.T.	Used with Hose No.	List Price
F-10	1/8"	13-FT	$25.00-C
F-11	¼"	13-FT	25.00-C
F-12	1/8"	14-FT	34.00-C
F-13	¼"	14-FT	30.00-C
F-14	1/8"	15-FT	50.00-C
F-15	¼"	15-FT	50.00-C
F-16	⅜"	15-FT	50.00-C
F-17	⅜"	16-FT	80.00-C
F-18	½"	16-FT	105.00-C

MALE IRON PIPE THREAD ELBOW TO HOSE



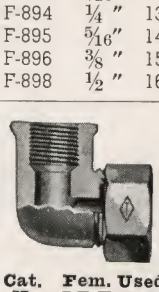
Cat. No.	Male I.P.T.	Used with Hose No.	List Price
F-19	1/8"	13-FT	$27.50-C
F-20	¼"	13-FT	27.50-C
F-21	1/8"	14-FT	30.00-C
F-22	¼"	14-FT	30.00-C
F-23	1/8"	15-FT	75.00-C
F-24	¼"	15-FT	75.00-C
F-25	⅜"	15-FT	75.00-C
F-26	⅜"	16-FT	115.00-C
F-27	½"	16-FT	135.00-C

FEMALE IRON PIPE THREAD TO HOSE



Cat. No.	Fem. I.P.T.	Used with Hose No.	List Price
F-28	1/8"	13-FT	$27.50-C
F-29	¼"	13-FT	27.50-C
F-30	1/8"	14-FT	30.00-C
F-31	¼"	14-FT	30.00-C
F-32	1/8"	15-FT	45.00-C
F-33	¼"	15-FT	45.00-C
F-34	⅜"	15-FT	45.00-C
F-35	⅜"	16-FT	80.00-C
F-36	½"	16-FT	105.00-C

FEMALE IRON PIPE THREAD ELBOW TO HOSE



Cat. No.	Fem. I.P.T.	Used with Hose No.	List Price
F-37	1/8"	13-FT	$28.50-C
F-38	¼"	13-FT	28.50-C
F-39	1/8"	14-FT	32.50-C
F-40	¼"	14-FT	32.50-C
F-41	1/8"	15-FT	75.00-C
F-42	¼"	15-FT	75.00-C
F-43	⅜"	15-FT	75.00-C
F-44	⅜"	16-FT	115.00-C
F-45	½"	16-FT	115.00-C

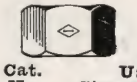
GROMMET

Cat. No.	Size	Used with Hose No.	List Price
103-FT	¼ "	13-FT	$1.50-C
106-FT	5/16"	14-FT	2.00-C
109-FT	⅜ "	15-FT	2.50-C
112-FT	½ "	16-FT	4.00-C

SLEEVE

Cat. No.	Size	Used with Hose No.	List Price
102-FT	¼ "	13-FT	$7.00-C
105-FT	5/16"	14-FT	8.00-C
108-FT	⅜ "	15-FT	9.00-C
111-FT	½ "	16-FT	11.00-C

NUT

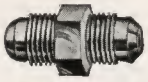


Cat. No.	Size	Used with Hose No.	List Price
101-FT	¼ "	13-FT	$9.00-C
104-FT	5/16"	14-FT	10.00-C
107-FT	⅜ "	15-FT	11.00-C
110-FT	½ "	16-ET	14.00-C

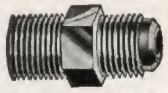
Imperial S. A. E. Standard Aluminum Alloy Flared Tube Couplings

These Aluminum Alloy Flare Tube Couplings are for use with ammonia, gas or where a light weight coupling is required. These couplings are all treated with a special thread lubricant, are free from chips and of good appearance.

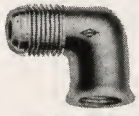

55-AL ELBOW


42-AL UNION


39-AL PLUG

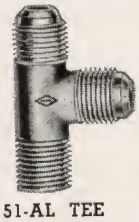

48-AL HALF UNION


49-AL ELBOW


50-AL ELBOW


40-AL PLUG

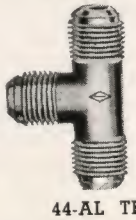

46-AL FEMALE COUPLING


51-AL TEE


41-AL NUT


641-AL NUT


45-AL TEE


44-AL TEE

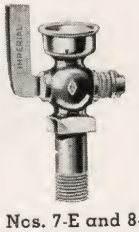
LIST PRICES PER 100 FITTINGS

Outside Diameter of Tube	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"
39-AL	$ 5.50	$ 6.00	$ 7.00	$10.00	$12.00	$14.00	$24.00	$ 42.00
40-AL	4.00	4.50	5.50	8.00	10.00	12.00	18.00	30.00
41-AL	4.00	6.00	8.50	14.00	18.00	22.00	40.00	45.00
42-AL	9.00	9.00	12.00	14.50	19.00	22.00	38.00	68.00
44-AL	18.00	21.00	22.00	26.00	36.00	40.00	73.00	140.00
55-AL	.....	15.00	16.50	22.00	32.00	34.00	50.00	100.00
641-AL	.....	13.00	.....	20.00	.....	25.00	34.00	50.00

Outside Diameter of Tube	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	3/8"	3/8"	3/8"	7/16"	1/2"	1/2"	1/2"	5/8"	5/8"	3/4"	3/4"
Iron Pipe Thread	1/8"	1/8"	1/4"	3/8"	1/8"	1/4"	1/8"	1/4"	3/8"	1/4"	1/4"	3/8"	1/2"	3/8"	1/2"	1/2"	3/4"
45-AL	$17.00	$20.00	$31.00	$.....	$22.00	$.....	$37.00	$25.00	$.....	$34.00	$.....	$37.00	$.....	$.....	$69.00	$135.00	$135.00
46-AL	.....	9.50	.....	.....	12.00	.....	.....	15.00	.....	20.00	.....	25.00	.....	.....	45.00	.....	.....
48-AL	7.00	7.50	12.00	20.00	9.00	16.00	16.00	12.00	18.00	14.50	22.00	17.00	25.00	36.00	28.00	60.00	60.00
49-AL	.....	10.50	19.00	30.00	12.50	23.00	19.00	15.00	30.00	21.00	26.50	22.50	56.00	52.00	48.00	95.00	95 00
50-AL	.....	15.00	.....	.....	19.00	.....	.....	22.50	.....	31.00	.....	34.00	.....	.....	.....	.....	.....
51-AL	.....	20.00	31.00	.....	22.00	.....	37.00	25.00	.....	34.00	.....	37.00	.....	.....	69.00	135.00	.....

Imperial Priming Cups


Nos. 5-E and 6-E


Nos. 7-E and 8-E


Nos. 11-E and 12-E

Catalog No.	5-E	6-E	7-E	8-E	11-E	12E
I. P. Thread	1/8	1/4	1/8	1/4	1/8	1/4
Diam. of Bowl	5/8	5/8	5/8	5/8	5/8	5/8
Price Each	.60	.70	.65	.70	.85	.90

Drain Cocks


LONG SHANK Nos. 20-E and 21-E


TEE HANDLE Nos. 37-E and 38-E

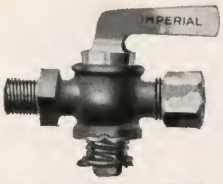

LEVER HANDLE Nos. 41-E to 44-E


NEEDLE SEAT Nos. 200-E to 203-E

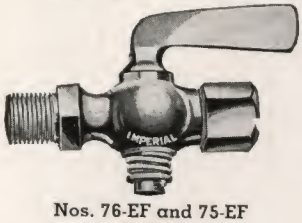
Catalog No.	20-E	21-E	37-E	38-E	41-E	42-E
I. P. Thread	1/8	1/4	1/8	1/4	1/8	1/4
Opening	5/32	5/32	5/32	5/32	7/32	5/16
Price Each	.90	1.00	.45	.65	.48	.65

Catalog No.	43-E	44-E	200-E	201-E	202-E	203-E
I. P. Thread	3/8	1/2	1/8	1/4	3/8	1/2
Opening	13/32	1/2	7/32	5/16	5/16	13/32
Price Each	1.00	1.20	.35	.50	1.35	1.45

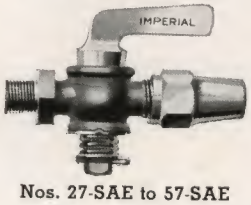
Shut-off Cocks



Nos. 27-EF to 57-EF



Nos. 76-EF and 75-EF



Nos. 27-SAE to 57-SAE

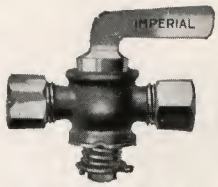
COMPRESSION TYPE

Cat. No.	Outside Diam of Tubing	Iron Pipe Thread	List Price Each
27-EF	¼ "	⅛"	$1.30
227-EF	¼ "	¼"	1.40
29-EF	5/16"	⅛"	1.30
229-EF	5/16"	¼"	1.40
57-EF	⅜ "	¼"	1.45
28-EF	¼ "	------	1.30
30-EF	5/16"	------	1.40
58-EF	⅜ "	------	1.70
76-EF	¼ "	⅛"	1.05
75-EF	5/16"	⅛"	1.10
89-EF	¼ "	⅛"	1.45
79-EF	5/16"	⅛"	1.55

FLARED TYPE—S. A. E.

Cat. No.	Outside Diam of Tubing	Iron Pipe Thread	List Price Each
27-SAE	¼ "	⅛"	$1.20*
227-SAE	¼ "	¼"	1.30*
29-SAE	5/16"	⅛"	1.20*
229-SAE	5/16"	¼"	1.40*
57-SAE	⅜ "	¼"	1.50*
28-SAE	¼ "	------	1.25*
30-SAE	5/16"	------	1.30*
58-SAE	⅜ "	------	1.50*

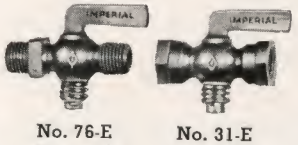
*Prices do not include S. A. E. Nuts. If nuts are desired, be sure to specify "with nuts."



Nos. 28-EF to 58-EF

Nos. 79-EF and 89-EF

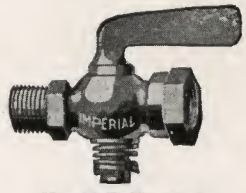
Nos. 28-SAE to 58-SAE



No. 76-E No. 77-E — No. 31-E No. 32-E

IRON PIPE THREAD TYPE

Cat. No.	I. P. Thread	List Price Ea.
76-E	⅛	.98
77-E	¼	1.25
31-E	⅛	1.05
32-E	¼	1.20
48-E	⅛	.98
49-E	¼	1.20



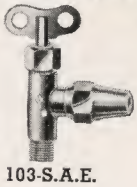
No. 48-E, No. 49-E

Imperial Shut-off Needle Valves

103-EF to 303-EF

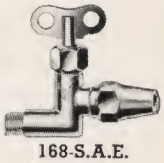
Catalogue No.	O. D. Tube	I. P. Thread	List Price Each
103-EF	¼ "	⅛"	.90
203-EF	5/16"	⅛"	1.05
204-EF	5/16"	¼"	1.40
303-EF	⅜ "	¼"	1.55
168-EF	¼ "	⅛"	1.05
169-EF	5/16"	⅛"	1.20
369-EF	5/16"	¼"	1.60
170-EF	⅜ "	¼"	1.65

168-EF to 170-EF



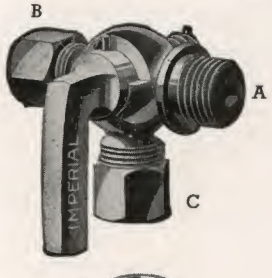
103-S.A.E. to 303-S.A.E.

Catalogue No.	O. D. Tube	I. P. Thread	List Price Each
103-S.A.E.	¼ "	⅛"	1.05*
203-S.A.E.	5/16"	⅛"	1.20*
204-S.A.E.	5/16"	¼"	1.30*
303-S.A.E.	⅜ "	¼"	1.45*
168-S.A.E.	¼ "	⅛"	1.00*
169-S.A.E.	5/16"	⅛"	1.05*
369-S.A.E.	5/16"	¼"	1.30*
170-S.A.E.	⅜ "	¼"	1.35*



168-S.A.E. to 170-S.A.E.

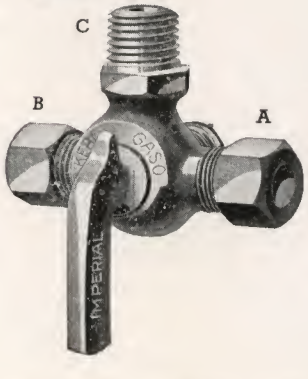
*Prices of above Valves do not include Nuts.



Imperial Three Way Cocks

Cat. No.	A	B	C	Price Each
60-EF	⅛"I.P.T.	¼ "O.D.	¼ "O.D.	$1.85
61-EF	⅛"I.P.T.	5/16"O.D.	5/16"O.D.	2.07
61-EF	¼"I.P.T.	5/16"O.D.	5/16"O.D.	2.07
112-EF	¼"I.P.T.	¼ "O.D.	¼ "I.P.T.	2.95

Flow is from "A" to "B" or from "A" to "C"



Cat. No.	A	B	C	Price Each
111-EF	5/16"O.D.	5/16"O.D.	⅛ "I.P.T.	$2.55
111-EF	5/16"O.D.	5/16"O.D.	¼ "I.P.T.	2.55
116-EF	5/16"O.D.	5/16"O.D.	5/16"O.D.	2.75
117-EF	¼ "O.D.	¼ "O.D.	⅛ "I.P.T.	2.35
120-EF	¼ "O.D.	¼ "O.D.	¼ "O.D.	2.45
121-EF	⅜ "O.D.	⅜ "O.D.	⅜ "O.D.	3.10

To shut off place handle in a vertical position

Gasoline Valves

Have bronze body and fluted metal hand wheels.

Nos. 98-E and 99-E

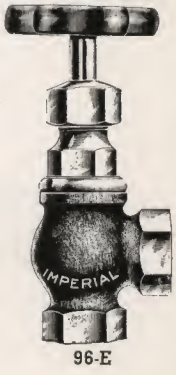
Cat. No.	Iron Pipe Thread	Price Each
98-E	⅛"	$1.40
99-E	¼"	1.55

98-E and 99-E

No. 96-E

¼"—Female Iron Pipe Thread.

Price, each $2.60.

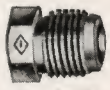


96-E

No. 76-Y

Cat. No.	Outside Diam. of Tube	Iron Pipe Thread	Body Only Price Per 100
76-Y	$\frac{3}{16}$" O.D. x $\frac{3}{16}$" O.D.	⅛"	$43.50
76-Y	⅛" O.D. x $\frac{5}{16}$" O.D.	⅛"	44.50
76-Y	$\frac{3}{16}$" O.D. x $\frac{5}{16}$" O.D.	⅛"	44.00

The 76-Y Fitting is threaded to take No. 181-D Nut.



No. 87-F

FORD CARBURETOR NUT

¼ O.D.....$12.50-C

No. 181-D

O.D. of Tube	Price Per 100
⅛	$ 7.00
$\frac{3}{16}$	7.50
¼	8.00
$\frac{5}{16}$	10.50
⅜	13.50
$\frac{7}{16}$	24.05
½	31.50

Compression Couplings

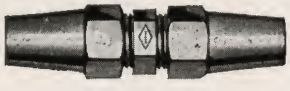
For Air Brakes on Trucks and Motor Coaches

No. 60-F SLEEVE

O. D. of Tube	List Price Per 100
¼"	$ 2.00
⅜"	3.50
½"	10.50
¾"	21.00
1 "	46.00

No. 161-F NUT

O. D. of Tube	List Price Per 100
¼"	$14.00
⅜"	27.50
½"	50.00
¾"	105.00
1 "	150.00



No. 162-F UNION

O. D. of Tube	List Price Per 100
¼"	$41.00
⅜"	74.00
½"	155.00
¾"	340.00

No. 168-F CONNECTOR

O. D. of Tube	Pipe Thread	List Price Per 100
¼"	⅛"	$ 25.00
¼"	¼"	30.00
⅜"	⅛"	48.50
⅜"	¼"	52.00
½"	⅜"	102.00
¾"	¾"	201.50
1 "	1 "	475.00

No. 166-F
FEMALE COUPLING

O. D. of Tube	Pipe Thread	List Price Per 100
¼"	⅛"	$ 25.00
¼"	¼"	27.50
⅜"	⅛"	54.50
⅜"	¼"	57.00
½"	⅜"	115.00

No. 169-F ELBOW

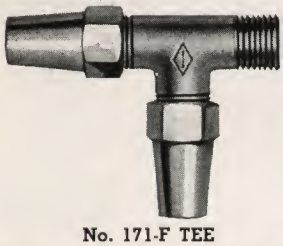
O. D. of Tube	Pipe Thread	List Price Per 100
¼"	⅛"	$ 34.00
¼"	¼"	39.00
⅜"	⅛"	63.00
⅜"	¼"	66.00
½"	⅜"	102.00

No. 170-F ELBOW

O. D. of Tube	Pipe Thread	List Price Per 100
¼"	⅛"	$ 36.00
⅜"	⅛"	51.50
⅜"	¼"	57.50
½"	⅜"	130.00

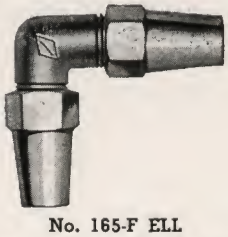
No. 172-F TEE

O. D. of Tube	Pipe Thread	List Price Per 100
¼"	⅛"	$ 56.00
⅜"	¼"	92.00
½"	⅜"	247.50



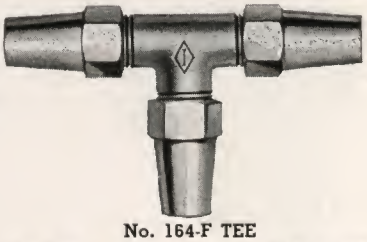
No. 171-F TEE

O. D. of Tube	Pipe Thread	List Price Per 100
¼"	⅛"	$ 56.00
⅜"	¼"	92.00
½"	⅜"	247.50



No. 165-F ELL

O. D. of Tube	Pipe Thread	List Price Per 100
¼"	¼"	$ 52.00
⅜"	⅜"	83.00
½"	½"	164.00



No. 164-F TEE

O. D. of Tube	List Price Per 100
¼"	$ 68.00
⅜"	118.50
½"	267.00
¾"	550.50

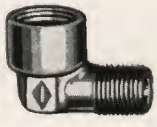
Inverted Flare Couplings

No. 41-W NUT

O. D. of Tube	List Price Per 100..
$\frac{3}{16}$"	$ 8.25
¼ "	10.30
$\frac{5}{16}$"	12.38
⅜ "	18.70

No. 48-W CONNECTOR

O. D. of Tube	List Price Per 100..
$\frac{3}{16}$"	$ 9.68
¼ "	11.50
$\frac{5}{16}$"	12.92
⅜ "	20.24

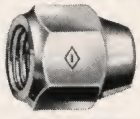


No. 49-W ELBOW

O. D. of Tube	List Price Per 100
$\frac{3}{16}$"	$17.60
¼ "	18.02
$\frac{5}{16}$"	21.17
⅜ "	34.25

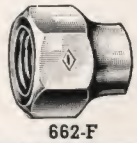
Imperial Refrigeration Fittings

Made from Forged Brass or Extruded Rod



641-F NUT
641-FS SHORT
641-FP FROST PROOF

O.D. of Tube	List Price Per 100 641-F	641-FS	641-FP
3/16	$ 9.50	$ 9.00	$18.00
1/4	9.50	9.00	19.00
5/16	11.00	10.50	22.00
3/8	12.00	11.50	24.00
7/16	14.00	13.00	32.00
1/2	15.00	14.00	35.00
5/8	23.00	22.00	45.00
3/4	40.00	38.00	85.00



662-F
REDUCING NUT

5/16x1/4	16.00
3/8x1/4	16.00
3/8x5/16	16.00
1/2x3/8	19.00
5/8x1/2	27.00
3/4x5/8	31.00

642-F
UNION

O.D. of Tube	Iron Pipe Thread	S.A.E. Thread	List Price Per 100
3/16	....	3/8 -24	9.00
1/4	....	7/16-20	9.00
5/16	....	1/2 -20	12.00
3/8	....	5/8 -18	14.50
7/16	....	11/16-16	19.00
1/2	....	3/4 -16	22.00
5/8	....	7/8 -14	38.00
3/4	....	1 1/16-14	68.00

656-F
REDUCING UNION

O.D. of Tube	S.A.E. Thread	S.A.E. Thread	List Price Per 100
5/16 to 1/4	1/2-20	7/16-20	20.00
3/8 to 1/4	5/8-18	7/16-20	22.50
3/8 to 5/16	5/8-18	1/2-20	22.50
7/16 to 3/8	11/16-16	5/8-18	27.00
1/2 to 1/4	3/4-16	7/16-20	30.00
1/2 to 3/8	3/4-16	5/8-18	30.00
5/8 to 1/2	7/8-14	3/4-16	46.00
3/4 to 1/2	1 1/16-14	3/4-16	76.00
3/4 to 5/8	1 1/16-14	7/8-14	76.00

644-F
TEE

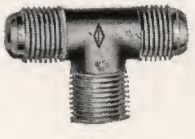
3/16	....	3/8 -24	18.00
1/4	....	7/16-20	21.00
5/16	....	1/2 -20	22.00
3/8	....	5/8 -18	26.00
7/16	....	11/16-16	36.00
1/2	....	3/4 -16	40.00
5/8	....	7/8 -14	73.00
3/4	....	1 1/16-14	140.00

658-F—REDUCING TEE

5/16 to 1/4	1/2-20	7/16-20	34.00
3/8 to 1/4	5/8-18	7/16-20	38.00
1/2 to 1/4	3/4-16	7/16-20	52.00
1/2 to 3/8	3/4-16	5/8-18	52.00
5/8 to 1/2	7/8-14	3/4-16	85.00
3/4 to 1/2	1 1/16-14	3/4-16	152.00

659-F—REDUCING TEE

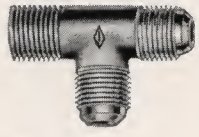
5/16 to 1/4	1/2-20	7/16-20	34.00
3/8 to 1/4	5/8-18	7/16-20	38.00
1/2 to 1/4	3/4-16	7/16-20	52.00
1/2 to 3/8	3/4-16	5/8-18	52.00
5/8 to 1/2	7/8-14	3/4-16	85.00



645-F
TEE

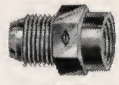
O.D. of Tube	Iron Pipe Thread	S.A.E. Thread	List Price Per 100
3/16	1/8	3/8 -24	17.00
1/4	1/8	7/16-20	20.00
1/4	1/4	7/16-20	31.00
5/16	1/8	1/2 -20	22.00
3/8	1/8	5/8 -18	37.00
3/8	1/4	5/8 -18	25.00
7/16	1/4	11/16-16	34.00
1/2	3/8	3/4 -16	37.00
5/8	1/2	7/8 -14	69.00
3/4	1/2	1 1/16-14	135.00
3/4	3/4	1 1/16-14	135.00

For Refrigerator Valves See Page No. 100.



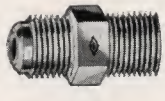
651-F
TEE

O.D. of Tube	Iron Pipe Thread	S.A.E. Thread	List Price Per 100
3/16	1/8	3/8 -24	$17.00
1/4	1/8	7/16-20	20.00
1/4	1/4	7/16-20	31.00
5/16	1/8	1/2 -20	22.00
5/16	1/4	1/2-20	37.00
3/8	1/8	5/8 -18	37.00
3/8	1/4	5/8 -18	25.00
3/8	3/8	5/8-18	49.00
7/16	1/4	11/16-16	34.00
1/2	3/8	3/4 -16	37.00
5/8	3/8	7/8-14	81.00
5/8	1/2	7/8 -14	69.00
3/4	1/2	1 1/16-14	135.00
3/4	3/4	1 1/16-14	135.00



646-F
FEMALE

1/4	1/8	7/16-20	9.50
1/4	1/4	7/16-20	19.00
5/16	1/8	1/2 -20	12.00
5/16	1/4	1/2 -20	19.00
3/8	1/4	5/8 -18	15.00
7/16	1/4	11/16-16	20.00
1/2	3/8	3/4 -16	25.00
5/8	1/2	7/8 -14	45.00

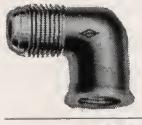


648-F
MALE
CONNECTOR

3/16	1/8	3/8 -24	7.00
1/4	1/8	7/16-20	7.50
1/4	1/4	7/16-20	12.00
1/4	3/8	7/16-20	20.00
5/16	1/8	1/2 -20	9.00
5/16	1/4	1/2 -20	16.00
5/16	3/8	1/2 -20	20.00
3/8	1/8	5/8 -18	16.00
3/8	1/4	5/8 -18	12.00
3/8	3/8	5/8 -18	18.00
7/16	1/4	11/16-16	14.50
1/2	1/4	3/4 -16	22.00
1/2	3/8	3/4 -16	17.00
1/2	1/2	3/4 -16	25.00
5/8	3/8	7/8 -14	36.00
5/8	1/2	7/8 -14	28.00
3/4	1/2	1 1/16-14	60.00
3/4	3/4	1 1/16-14	60.00

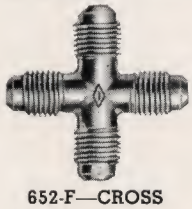
649-F
MALE ELBOW
CONNECTOR

3/16	1/8	3/8 -24	10.00
1/4	1/8	7/16-20	10.50
1/4	1/4	7/16-20	19.00
1/4	3/8	7/16-20	30.00
5/16	1/8	1/2 -20	12.50
5/16	1/4	1/2 -20	23.00
5/16	3/8	1/2 -20	30.00
3/8	1/8	5/8 -18	19.00
3/8	1/4	5/8 -18	15.00
3/8	3/8	5/8 -18	30.00
7/16	1/4	11/16-16	21.00
1/2	1/4	3/4 -16	26.50
1/2	3/8	3/4 -16	22.50
1/2	1/2	3/4 -16	50.00
5/8	3/8	7/8 -14	52.00
5/8	1/2	7/8 -14	48.00
3/4	1/2	1 1/16-14	95.00
3/4	3/4	1 1/16-14	95.00



650-F
FEM.
ELBOW
CONN.

1/4	1/8	7/16-20	15.00
5/16	1/8	1/2 -20	19.00
3/8	1/4	5/8 -18	22.50
7/16	1/4	11/16-16	31.00
1/2	3/8	3/4 -16	34.00



652-F—CROSS

3/16	....	3/8 -24	29.50
1/4	....	7/16-20	31.00
5/16	....	1/2 -20	33.00
3/8	....	5/8 -18	53.00
7/16	....	11/16-16	60.00
1/2	....	3/4 -16	64.00
5/8	....	7/8 -14	90.00

(Continued on next page)

Imperial Refrigeration Fittings

(Continued from preceding page)

655-F UNION ELBOW

O.D. of Tube	S.A.E. Thread	S.A.E. Thread	List Price Per 100
3/16	....	3/8 -24	$11.00
1/4	....	7/16-20	15.00
5/16	....	1/2 -20	16.50
3/8	....	5/8 -18	22.00
7/16	....	11/16-16	32.00
1/2	....	3/4 -16	34.00
5/8	....	7/8 -14	50.00
3/4	....	1 1/16-14	100.00

657-F—REDUCING ELBOW UNION

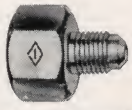
5/16 to 1/4	1/2-20	7/16-20	24.50
3/8 to 1/4	5/8-18	7/16-20	30.00
1/2 to 1/4	3/4-16	7/16-20	42.00
1/2 to 3/8	3/4-16	5/8-18	42.00
5/8 to 3/8	7/8-14	5/8-18	58.00
5/8 to 1/2	7/8-14	3/4-16	58.00
3/4 to 1/2	1 1/16-14	3/4-16	108.00
3/4 to 5/8	1 1/16-14	7/8-14	108.00

639-F FLARED TUBE SEALING PLUGS

3/16	3/8-24	5.50
1/4	7/16-20	6.00
5/16	1/2-20	7.00
3/8	5/8-18	10.00
7/16	11/16-16	12.00
1/2	3/4-16	14.00
5/8	7/8-14	24.00
3/4	1 1/16-14	42.00

660-F MULTIPLE VALVE CONNECTION

O.D. of Tube	S.A.E. Thread	S.A.E. Thread	List Price Per 100
1/4	7/16-20	.....	18.00
5/16	1/2-20	.....	21.00
3/8	5/8-18	.....	27.00
7/16	11/16-16	.....	34.00
1/2	3/4-16	.....	36.00
5/8	7/8-14	.....	54.00
3/4	1 1/16-14	.....	100.00



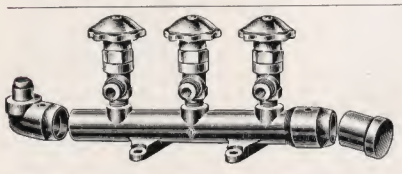
661-F—REDUCER

O.D. of Tube Female	O.D. of Tube Male			
5/16	1/4	1/2-20	7/16-20	30.00
1/4	3/8	7/16-20	5/8-18	26.00
1/4	1/2	7/16-20	3/4-16	26.00
3/8	1/4	5/8-18	7/16-20	35.00
3/8	5/16	5/8-18	1/2-20	43.00
3/8	1/2	5/8-18	3/4-16	35.00
1/2	1/4	3/4-16	7/16-20	44.00
1/2	3/8	3/4-16	5/8-18	44.00
1/2	5/8	3/4-16	7/8-14	44.00
5/8	1/2	7/8-14	3/4-16	62.00
5/8	3/4	7/8-14	1 1/16-14	62.00

640-F and 640-FB FLARED FITTING CAP NUTS

		List Price Per 100 640-F	List Price Per 100 640-FB
3/16	3/8-24	4.00	5.30
1/4	7/16-20	4.50	6.00
5/16	1/2-20	5.50	7.30
3/8	5/8-18	8.00	10.65
7/16	11/16-16	10.00	13.30
1/2	3/4-16	12.00	16.00
5/8	7/8-14	18.00	24.00
3/4	1 1/16-14	30.00	40.00

(No. 640-F is made from extruded Brass and No. 640-FB is made from extruded bronze.)



Imperial Forged Brass Manifolds

Manifolds can be furnished with or without valves. Prices of manifolds with valves are listed below. Plugs and caps are not included. They are listed with the manifold adapters.

Manifolds are furnished in two sizes. One size has opening on the ends for 1⅛ inch O. D. tube and is drilled and tapped for ¼ inch or ⅜ inch female I. P. T. with 3¼ inch centers and is for angle valves having ¼, ⅜ or ½ inch O. D. tubing at outlet of valve. The other manifold has opening for 1⅝ inch O. D. tubing and is drilled and tapped for ½ or ¾ inch female I. P. T. with 4¼ inch centers and is for angle valves having ⅝ or ¾ inch O. D. tubing connection at outlet of valve. The sylpak angle valve can be assembled in manifolds with outlet of valve either for flare connection or with solder joint. On the following page are the various manifold adapters which, when joined to the ends of the manifold, will enable you to have practically any size tubing connection desired.

MANIFOLDS ASSEMBLED WITH NO. 192-C or 192-CS SYLPAK ANGLE VALVES

Catalog Nos. Outlet of Valve for S.A.E. Fitting	Outlet of Valve for Solder Joint	Tube Size Outlet of Valve	Number of Valves	List Price Each
24-MF	24-MS	¼"	2	$ 6.85
34-MF	34-MS	¼"	3	9.65
44-MF	44-MS	¼"	4	12.50
54-MF	54-MS	¼"	5	15.00
64-MF	64-MS	¼"	6	18.00
74-MF	74-MS	¼"	7	20.50
84-MF	84-MS	¼"	8	23.00
94-MF	94-MS	¼"	9	25.50
104-MF	104-MS	¼"	10	28.00
26-MF	26-MS	⅜"	2	6.85
36-MF	36-MS	⅜"	3	9.65
46-MF	46-MS	⅜"	4	12.50
56-MF	56-MS	⅜"	5	15.00
66-MF	66-MS	⅜"	6	18.00
76-MF	76-MS	⅜"	7	20.50
86-MF	86-MS	⅜"	8	23.00
96-MF	96-MS	⅜"	9	25.50
106-MF	106-MS	⅜"	10	28.00
28-MF	28-MS	½"	2	6.85
38-MF	38-MS	½"	3	9.65
48-MF	48-MS	½"	4	12.50
58-MF	58-MS	½"	5	15.00
68-MF	68-MS	½"	6	18.00
78-MF	78-MS	½"	7	20.50
88-MF	88-MS	½"	8	23.00
98-MF	98-MS	½"	9	25.50
108-MF	108-MS	½"	10	28.00

MANIFOLDS ASSEMBLED WITH NO. 62-C VALVE WITH WRENCH WING SEAL CAPS

Catalog No. Outlet of Valve for S.A.E. Fitting	Tube Size of Valves	Number of Valves	List Price Each
24-MPF	¼"	2	$ 5.60
34-MPF	¼"	3	7.80
44-MPF	¼"	4	10.00
54-MPF	¼"	5	12.20
64-MPF	¼"	6	14.40
74-MPF	¼"	7	16.00
84-MPF	¼"	8	17.50
94-MPF	¼"	9	20.50
104-MPF	¼"	10	23.25
26-MPF	⅜"	2	5.60
36-MPF	⅜"	3	7.80
46-MPF	⅜"	4	10.00
56-MPF	⅜"	5	12.20
66-MPF	⅜"	6	14.40
76-MPF	⅜"	7	16.00
86-MPF	⅜"	8	17.50
96-MPF	⅜"	9	20.50
106-MPF	⅜"	10	23.25
28-MPF	½"	2	6.00
38-MPF	½"	3	8.40
48-MPF	½"	4	10.80
58-MPF	½"	5	13.20
68-MPF	½"	6	15.60
78-MPF	½"	7	17.40
88-MPF	½"	8	19.10
98-MPF	½"	9	22.30
108-MPF	½"	10	25.25

For 1⅝" O. D. Tubing Manifolds, Manifold Bars Only, and Manifold Adapters, see following page.

MANIFOLDS ASSEMBLED WITH NO. 192-C OR 192-CS SYLPAK ANGLE VALVES

Catalog Nos. Outlet of Valve for S.A.E. Fitting	Catalog Nos. Outlet of Valve for Solder Joint	Tube Size Outlet of Valve	Number of Valves	List Price Each
210-MF	210-MS	5/8"	2	$11.50
310-MF	310-MS	5/8"	3	16.00
410-MF	410-MS	5/8"	4	20.50
510-MF	510-MS	5/8"	5	26.00
610-MF	610-MS	5/8"	6	30.00
212-MF	212-MS	3/4"	2	12.25
312-MF	312-MS	3/4"	3	17.75
412-MF	412-MS	3/4"	4	22.25
512-MF	512-MS	3/4"	5	29.00
612-MF	612-MS	3/4"	6	33.60

MANIFOLDS ASSEMBLED WITH NO. 62-C VALVE WITH WRENCH WING SEAL CAPS

Catalog No. Outlet of Valve for S.A.E. Fitting	Tube Size of Valve	Number of Valves	List Price Each
210-MPF	5/8"	2	$ 8.00
310-MPF	5/8"	3	11.50
410-MPF	5/8"	4	14.80
510-MPF	5/8"	5	18.20
610-MPF	5/8"	6	21.65
212-MPF	3/4"	2	8.60
312-MPF	3/4"	3	12.40
412-MPF	3/4"	4	16.00
512-MPF	3/4"	5	19.70
612-MPF	3/4"	6	23.45

Manifold Bar Only

ENDS FOR 1 1/8" O.D. TUBING

Catalog No.	Tapped for Female Iron Pipe Thread	No. Valve Openings	Tapped for Female Iron Pipe Thread	List Price Each
72-CS	1/4"	2	1/4"	$2.60
72-CS	3/8"	2	3/8"	2.60
73-CS	1/4"	3	1/4"	3.30
73-CS	3/8"	3	3/8"	3.30

END FOR 1 5/8" TUBING

Catalog No.	Tapped for Female Iron Pipe Thread	No. Valve Openings	Tapped for Female Iron Pipe Thread	List Price Each
74-CS	1/2"	2	1/2"	$3.30
74-CS	3/4"	2	3/4"	3.30
75-CS	1/2"	3	1/2"	4.20
75-CS	3/4"	3	3/4"	4.20

Manifold Adapters

Manifold Adapters are made on one end to fit either the male or female end of the manifold. The other end is for various sizes of flare or solder joints in straight or elbow types.

TO FIT FEMALE END OF MANIFOLD WITH EITHER FLARE OR SOLDER CONNECTION ON OTHER END

38-SF FLARE

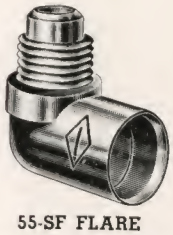
22-S SOLDER

For Manifolds with Valves for 1/4", 3/8" or 1/2" Tubing.

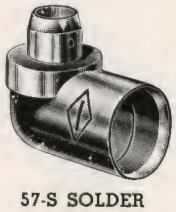
	List Each		List Each
1/4" S.A.E. Flare	$0.30	1/4" O.D. Solder	$0.30
3/8" S.A.E. Flare	.30	3/8" O.D. Solder	.30
1/2" S.A.E. Flare	.30	1/2" O.D. Solder	.30
5/8" S.A.E. Flare	.30	5/8" O.D. Solder	.30

For Manifolds with Valves for 5/8" or 3/4" Tubing.

	List Each		List Each
5/8" S.A.E. Flare	$0.50	5/8" O.D. Solder	$0.50
3/4" S.A.E. Flare	.50	3/4" O.D. Solder	.50
		7/8" O.D. Solder	.50
		1 1/8" O.D. Solder	.50



55-SF FLARE



57-S SOLDER

For Manifolds with Valves for 1/4", 3/8" or 1/2" Tubing.

	List Each		List Each
1/4" S.A.E. Flare	$0.90	1/4" O.D. Solder	$0.90
3/8" S.A.E. Flare	.90	3/8" O.D. Solder	.90
1/2" S.A.E. Flare	.90	1/2" O.D. Solder	.90
5/8" S.A.E. Flare	.90	5/8" O.D. Solder	.90

For Manifolds with Valves for 5/8" or 3/4" Tubing

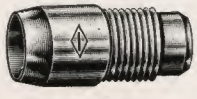
	List Each		List Each
5/8" S.A.E. Flare	$1.30	5/8" O.D. Solder	$1.30
3/4" S.A.E. Flare	1.30	3/4" O.D. Solder	1.30
		7/8" O.D. Solder	1.30
		1 1/8" O.D. Solder	1.30

PLUGS TO FIT FEMALE END OF MANIFOLD FOR 2 OR 3 HOLE MANIFOLD

239-S SOLDER

	List Each
For 1 1/8" O.D. Ends	$0.30
For 1 5/8" O.D. Ends	.90

TO FIT MALE END OF MANIFOLD WITH EITHER FLARE OR SOLDER CONNECTION ON EITHER END



138-SF FLARE

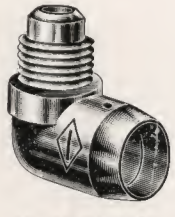
122-S SOLDER

For Manifolds with Valves for 1/4", 3/8" or 1/2" Tubing.

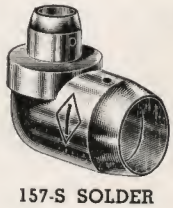
	List Each		List Each
1/4" S.A.E. Flare	$0.30	1/4" O.D. Solder	$0.30
3/8" S.A.E. Flare	.30	3/8" O.D. Solder	.30
1/2" S.A.E. Flare	.30	1/2" O.D. Solder	.30
5/8" S.A.E. Flare	.30	5/8" O.D. Solder	.30

For Manifolds with Valves for 5/8" or 3/4" Tubing.

	List Each		List Each
5/8" S.A.E. Flare	$0.50	5/8" O.D. Solder	$0.50
3/4" S.A.E. Flare	.50	3/4" O.D. Solder	.50
		7/8" O.D. Solder	.50
		1 1/8" O.D. Solder	.50



155-SF FLARE



157-S SOLDER

For Manifolds with Valves for 1/4", 3/8" or 1/2" Tubing.

	List Each		List Each
1/4" S.A.E. Flare	$0.90	1/4" O.D. Solder	$0.90
3/8" S.A.E. Flare	.90	3/8" O.D. Solder	.90
1/2" S.A.E. Flare	.90	1/2" O.D. Solder	.90
5/8" S.A.E. Flare	.90	5/8" O.D. Solder	.90

For Manifolds with Valves for 5/8" or 3/4" Tubing

	List Each		List Each
5/8" S.A.E. Flare	$1.30	5/8" O.D. Solder	$1.30
3/4" S.A.E. Flare	1.30	3/4" O.D. Solder	1.30
		7/8" O.D. Solder	1.30
		1 1/8" O.D. Solder	1.30

CAPS TO FIT MALE END OF MANIFOLD FOR 2 OR 3 HOLE MANIFOLD

140-S SOLDER

	List Each
For 1 1/8" O.D. Ends	$0.30
For 1 5/8" O.D. Ends	.90

MANIFOLD UNION COUPLING

Imperial offers a specially designed No. 670-F Manifold Union Coupling which can be used to couple three-way line valves together and eliminate the use of manifold bars in many instances.

It is possible to couple any number of valves in a row, and to shut off any one or more valves without interfering with the remaining valves.

This coupling may be used with the following three-way valves: No. 106-C, No. 107-C or No. 207-C.

This Coupling is furnished in the following sizes:

670-F

O.D. S.A.E.	List Each
¼"	$0.35
5/16"	.50
⅜"	.60
½"	.70
⅝"	.75

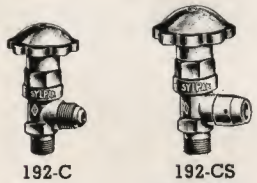
"SYLPAK" VALVES

Listed as Standard by Underwriters' Laboratories, Inc.

Imperial's "SYLPAK" Valves offer a line of valves that are positive and dependable. It is the type of valve that can be installed with the assurance that it will give uninterrupted service and which meets the exacting demands required in refrigeration work.

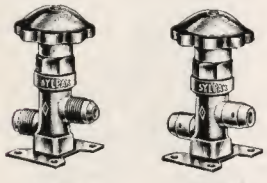
The well known sylphon principle is used and while the valve is in operation, it is possible to change the sylphon in case of a rupture while the valve is under pressure, and without losing any of the refrigerant. The sylphon is also protected at all times while the valve is in operation—either open, or closed or any intermediate point.

Dependability of the sylphons used in the valves—In actual official tests the sylphons were able to withstand more than 100,000 cycles of oscillation without a rupture. This is many more cycles of oscillation than would be required of any valve in actual practice, and to our knowledge never equalled in the refrigeration field. The valve will also withstand pressures far in excess of any working pressures ever encountered in this field.



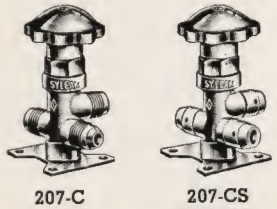
192-C (S.A.E.) 192-CS (SOLDER)
ANGLE SHUT-OFF VALVE

O.D.	Iron Pipe Thread	List Price Each
¼"	¼"	$2.20
5/16"	¼"	2.20
⅜"	¼"	2.20
½"	⅜"	2.20
⅝"	½"	3.40
¾"	½"	4.00
¾"	¾"	4.00



192-C (S.A.E.) 192-CS (SOLDER)
TWO-WAY LINE SHUT-OFF VALVE

¼"		$2.65
5/16"		2.65
⅜"		2.65
½"		2.65
⅝"		3.55
⅜"	Female I.P.S.	3.55



207-C (S.A.E.) 207-CS (SOLDER)
THREE-WAY LINE SHUT-OFF VALVE

¼"		$2.87
5/16"		2.87
⅜"		2.87
½"		2.87
⅝"		3.80
⅜"	Female I.P.S.	3.80

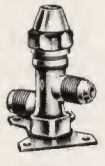
62-C
ANGLE SHUT-OFF VALVE

O.D. of Tube	S.A.E. Thread	Iron Pipe Thread	List Price Ea.
¼"	7/16"-20	¼"	$1.32
¼"	7/16"-20	⅜"	1.32
5/16"	½"-20	¼"	1.32
⅜"	⅝"-18	¼"	1.32
⅜"	⅝"-18	⅜"	1.32
½"	¾"-16	⅜"	1.54
⅝"	⅞"-14	½"	2.52
¾"	1 1/16"-14	½"	2.80
¾"	1 1/16"-14	¾"	2.80

Iron Pipe Thread Female	Male	
¼"	¼"	1.50
¼"	⅜"	1.50

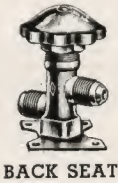
92-C BACK SEATING
ANGLE SHUT-OFF VALVE

¼	7/16-20	¼	1.80
¼	7/16-20	⅜	1.80
5/16	½-20	¼	1.80
⅜	⅝-18	¼	1.80
⅜	⅝-18	⅜	1.80
½	¾-16	⅜	2.05
⅝	⅞-14	½	3.03



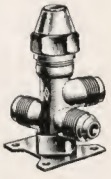
63-C—TWO-WAY LINE
SHUT-OFF VALVE

¼	7/16-20	....	1.80
5/16	½-20	....	1.80
⅜	⅝-18	....	1.80
½	¾-16	....	1.80
⅝	⅞-14	....	2.68
⅜	Female	I. P. S.	2.68



93-C BACK SEATING
TWO-WAY LINE
SHUT-OFF VALVE

¼	7/16-20	....	2.40
5/16	½-20	....	2.40
⅜	⅝-18	....	2.40
½	¾-16	....	2.40
⅝	⅞-14	....	3.18
⅜	Female	I. P. S.	3.18



106-C
THREE-WAY
SHUT-OFF VALVE

O.D. of Tube	S.A.E. Thread	List Price Ea.
¼ x¼ x¼	7/16-20	1.99
5/16x5/16x5/16	½ -20	1.99
⅜ x⅜ x⅜	⅝ -18	1.99
½ x½ x¼	¾ -16 / 7/16-20	1.99
½ x½ x½	¾ -16	1.99
⅝ x⅝ x⅝	⅞ -14	2.94
⅜ Female	I. P. S.	2.94

We appreciate small orders and give prompt service.

107-C

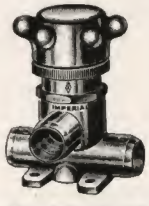
Tube Size	S. A. E. Thread	List Price Each
¼"x¼"x¼"	7/16"-20	$2.60
5/16"x5/16"x5/16"	½"-20	2.60
⅜"x⅜"x⅜"	5/8"-18	2.60
½"x½"x¼"	¾"-16 7/16"-20	2.60
½"x½"x½"	¾"-16	2.60
5/8"x5/8"x5/8"	⅞"-14	3.45
	⅜" Female Iron Pipe Thread	3.45

THREE WAY BACK SEATING SHUT-OFF VALVE WITH INDICATOR WHEEL IN BRASS

Packless Line Shut-off Valve

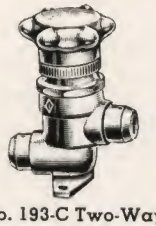
Tube Size	List Price Each
¾"	$ 6.90
⅞"	12.00
1 "	12.00
1⅛"	16.00
1¼"	35.00
1⅜"	35.00
1½"	37.00
1⅝"	37.00

NO. 193-CS TWO-WAY WITH SOLDER CONNECTION



¾"	$ 8.00
⅞"	14.90
1 "	14.90
1⅛"	17.25
1¼"	36.70
1⅜"	36.70
1½"	38.70
1⅝"	38.70

NO. 207-CS THREE-WAY WITH SOLDER CONNECTION

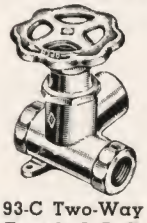


No. 193-C Two-Way Female I. P. T.
No. 207-C Three-Way Female I. P. T.

(Back Seating)

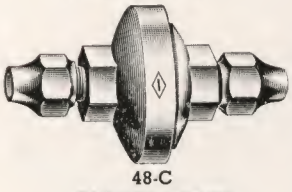
Female Iron Pipe Thread	List Price 193-C	Each 207-C
½"	$ 5.34	$ 5.75
¾"	12.00	13.00
1 "	16.00	17.25
1¼"	35.00	36.70
1½"	37.00	38.70

Double Packed Line Shut-off Valve



93-C Two-Way Female I. P. T.
107-C Three-Way Female I. P. T.

Female Iron Pipe Thread	List Price 93-C	Each 107-C
½"	$ 4.00	$4.20
¾"	5.75	6.00
1 "	6.50	6.50
1½"	18.00	.....



48-C
FORGED BRASS LINE STRAINER

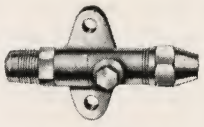
Made of heavy brass forgings to prevent cracking and seepage. Inside capacity is large, insuring a depository for all tube scale, compressor chips, or dirt in oil.

O.D. of Tube	Overall Length	List Price Ea.
¼ "	2 25/32"	$1.40
5/16"	2 29/32"	1.40
⅜ "	3 1/32"	1.40
½ "	3 9/32"	1.40

Also supplied with male pipe thread one end.

NO. 185-C STRAINER

1C" Overall, Wt. 2¾ Lbs. ¼" S. A. E. Connections.
List Price, Each.....$4.50



COMPRESSOR VALVES WITH BACK-SEATING NEEDLE SHUT-OFF

Catalog No.	Tube Size	Bolt Hole Center to Center	Bolt Holes	List Prices Each
43-C	¼ "	1⅜"	9/32"	$2.00
43-C	5/16"	1⅜"	9/32"	2.00
43-C	⅜ "	1⅜"	9/32"	2.00
43-C	½ "	1⅜"	9/32"	2.00
44-C	¼ "	1½"	11/32"	2.00
44-C	5/16"	1½"	11/32"	2.00
44-C	⅜ "	1½"	11/32"	2.00
44-C	½ "	1½"	11/32"	2.00
45-C	¼ "	1⅝"	11/32"	2.00
45-C	5/16"	1⅝"	11/32"	2.00
45-C	⅜ "	1⅝"	11/32"	2.00
45-C	½ "	1⅝"	11/32"	2.00
46-C	¼ "	1¾"	11/32"	2.12
46-C	5/16"	1¾"	11/32"	2.12
46-C	⅜ "	1¾"	11/32"	2.12
46-C	½ "	1¾"	11/32"	2.12

Nos. 343-C, 344-C, 345-C and 346-C same as above, but with Exposed Stem.

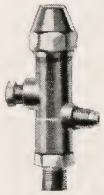
HEAVY DUTY TYPE FOR LARGE COMPRESSORS

Tube Size	Bolt Hole Center to Center	Bolt Holes	List Price 257-C	List Price 57-C
¼ "	1⅝"	11/32"	$2.75	$2.85
5/16"	1⅝"	11/32"	2.75	2.85
⅜ "	1⅝"	11/32"	2.75	2.85
½ "	1⅝"	11/32"	2.75	2.85
⅝ "	1⅝"	11/32"	2.90	3.00

No. 57-C with raised base. No. 257-C with flat base.
Unless otherwise specified No. 57-C will be supplied.
Nos. 357-CF and 357-CR same as above, but with Exposed Stem.

Tube Inlet	Size Outlet	Pipe Size	List Price Each
¼	¼	⅜	$2.00
⅜	¼	⅜	2.00

47-C—COMBINATION LIQUID RECEIVER TANK VALVE WITH CONDENSER LINE CONNECTION



91-C

	Tube Size	Pipe Size	List Price Each
	¼	¼	$1.89
	5/16	¼	1.89
	⅜	¼	1.89
94-C Same as 91-C except that the flared and iron pipe thread connections are reversed	¼	¼	1.89
	5/16	¼	1.89
	⅜	¼	1.89
	½	¼	1.89

BACK SEATING SHUT-OFF VALVE FOR LIQUID RECEIVERS AND COMPRESSORS

No. 214-C—LIQUID LINE SCALE TRAP

This liquid line scale trap is to protect the operating valves on both commercial and multiple installations. The cylindrical shaped 120 mesh brass screen has an area of over ten square inches. There is ample space between the screen and the wall of the trap, to permit passage of the refrigerant and the trapping of any scale or foreign matter.

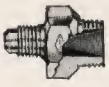
There is a No. 64-C Copper Seal Cap and a No. 641-F Forged Nut on each end to keep out the moisture. The nuts can be used to connect the trap to the line.

No. 214-C—¼" O.D. Tube Scale Trap.....List Price $1.60 Each

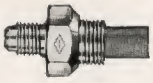
Evaporator Valve Strainers

These strainers are good insurance against clogged evaporators. They are all furnished with 120x108 mesh brass screen.

No. 175-C
¼" O.D. Tube x ¼" Iron Pipe Thread
List Price **$0.39** Each



No. 176-C—¼" O.D. Tube x ⅝"—18 Thread.
List Price **$0.45** Each

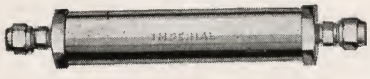


No. 177-C—¼" O.D. x ⅝"—18 Thread.
List Price **$0.45** Each

No. 178-C—Replaces Kelvinator No. 6133 strainer used on float valve
List Price **$0.22** Each

No. 179-C—Replaces Frigidaire No. 82332 Float Valve Strainer.
List Price **$0.20** Each

Dehydrator



It is advisable to use a dehydrator in refrigeration installations to remove any moisture which may be in the system. When using refrigerants, such as sulphur dioxide, methyl chloride, ethyl chloride, and dichlorodifluoromethane (Kinetic No. 12), any moisture in the system may cause a great deal of trouble. The dehydrator when installed is good insurance against any moisture freezing in the system or any compressor trouble.

The dehydrator is made of brass and is filled with Activated Alumina which has great absorptive power and does not dissolve. It will not break up and circulate through the system and has no chemical reaction with metals, refrigerant or water.

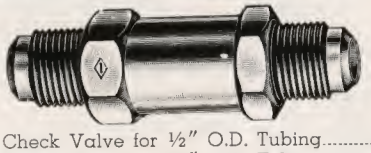
No.	Outside Diam. of Tube	Length Overall	Dehydrator Diameter	List Price Each
55-C	¼"	7"	1 1/16"	$2.50

Large Dehydrators

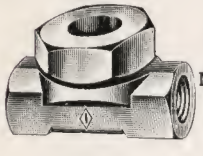
No.	Shell Length	Capacity Cu. In.	List Price Each
304-C	4"	8.28	$3.40
306-C	6"	12.3	4.50
309-C	9"	18.3	6.00
312-C	12"	24.1	7.50

Each length for ¼", ⅜" or ½" O. D. Tubing. In ordering specify size.

Suction Line Check Valve

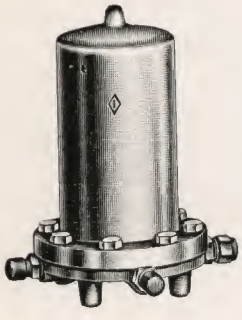


No. 180-C—Suction Line Check Valve for ½" O.D. Tubing.....**$2.62** Each
No. 180-C—Suction Line Check Valve for ⅝" O.D. Tubing.....**$3.78** Each



Imperial Bull's Eye or Liquid Indicator

No. 183-C—Bull's Eye or Liquid Indicator.....**$1.15** Each
¼" Female Iron Pipe Thread on both ends.



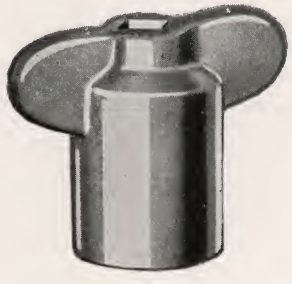
Hi-Side Float

Furnished in white nickel finish.

Overall Height.....6½"
Diameter of Flange.....4"
Weight.....6 lbs.

No. 210-C—Imperial Hi-Side Float.
List Price.....**$12.00** Each

WRENCH WING SEAL CAP MADE FROM BRASS FORGING



For all ¼", 5/16" and ⅜" shut-off valves. Used as a combination seal cap and wrench for stem of valve. This cap is one of the types required by Refrigeration Codes in many cities.

No. 41-C—Wrench Wing Seal Cap. Each.....**$0.48**

No. 105-C—Wrench Wing Seal Cap is for ½" and ⅝" valves. Each.....**$0.90**

No. 625-F—COPPER FLARE GASKET

List Price Per 100						
¼"	5/16"	⅜"	7/16"	½"	⅝"	¾"
$2.00	$2.25	$2.50	$3.00	$3.50	$4.25	$6.00

FLARED TUBE COPPER SEAL CAP

Fits in regular flare nut and when attached to the tube end of flared fitting makes a positive seal.

No. 64-C

List Price Per 100			
3/16"	¼"	5/16"	⅜"
$1.50	$1.50	$1.75	$2.00
7/16"	½"	⅝"	¾"
$2.70	$3.00	$3.75	$6.00

Accumulator

Two sizes:

No. 216-C—3½" O.D. x 8" overall.
List Price.....**$6.00**

No. 217-C—3½" O.D. x 14" overall.
List Price.....**$6.75**

NO. 212-C LOADED CHECK VALVE

Use in conjunction with 210-C Hi-Side Float when it cannot be placed inside the cooling chamber.

Loaded for different pressures for various gasses.

No. 212-C Loaded Check Valve. List Price, each.....**$2.85**
Specify type of refrigerant to be used.

HI-SIDE FLOAT

Furnished in White Nickel Finish.

Overall Height.....6¼"
Diameter—Maximum.....3¼"
Weight.....1⅓ Lbs.

No. 211-C Imperial Hi-Side Float.
List Price, Each.....**$6.50**

No. 213-C Imperial Low Side Float With Forged Brass Head and Shut-off Valves

The Imperial Low Side Float Assembly was designed to fit the Mullins Evaporators. This evaporator is one of the outstanding evaporators on the market, and the large number of this type in use means a large replacement demand for Low Side Floats. The needle valve assembly is of a simple, well-tried design. Liquid level and skimmer level are both set at factory. When used in the proper evaporator, will give about a 3/8-inch oil blanket which has been found to be most efficient and practical. The forged-brass header has four bolt holes 2.859 inch bolt centers, and gasket size of $2\frac{13}{64}$" I. D. by $2\frac{29}{64}$" O. D. Header is equipped with capped shut-off valves at both inlet and outlet and screened inlet fitting—very much desired by the service man. Furnished with 1/4-inch flare connection on the inlet (liquid line) and with outlet (suction line) flare connection for 1/4, $\frac{5}{16}$ or 3/8-inch O. D. flare connection.

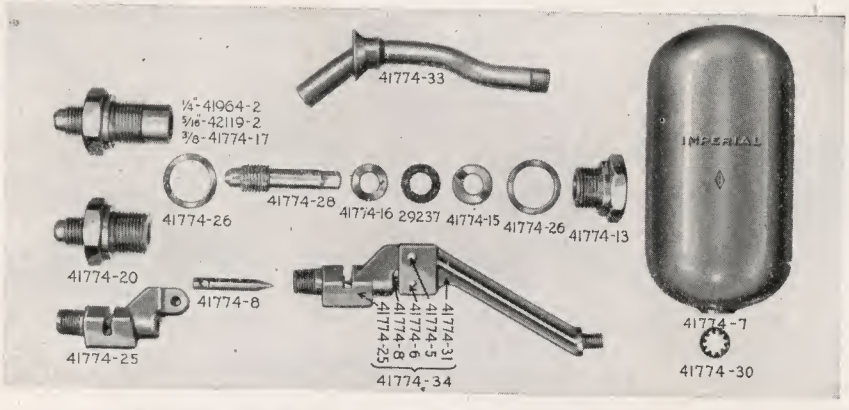
Can be furnished for right or left hand assembly.

Unless otherwise specified, Right Hand assembly with 1/4" inlet and 3/8" outlet will be furnished.

When facing the header, the inlet and outlet connections are on the right hand side, on right hand assemblies; on left hand, on left hand assemblies.

No. 213-C—Imperial Low Side Float.....List, each $12.00

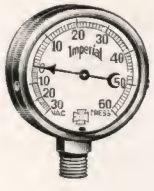
Specify size of inlet and outlet connections and whether right or left hand assemblies. Weight approx. 1½ lbs. each.



Replacement Parts for No. 213-C Low Side Float

Part No.	Description	List Price Each
29237	Packing	$0.10
41774-5	Pivot Pin for Guide	.05
41774-6	Pin for Needle	.05
41774-7	Float	1.50
41774-8	Needle	.90
41774-13	Cap	.13
41774-15	Headless Screw Plug	.07
41774-16	Washer	.05
41774-17	3/8" O. D. Flare Outlet (Suction Line) Connection	.35
41774-20	1/4" O. D. Flare Inlet (Liquid Line) Connection with screen	.45
41774-25	Needle Guide Assembly	$0.80
41774-26	Gasket	.05
41774-28	Valve Stems	.20
41774-30	Lock Washers	.03
41774-31	Float Arm	1.00
41774-33	Skimmer Tube Assembly	.45
41774-34	Needle and Arm Assembly	2.50
41964-2	1/4" O. D. Flare Outlet (Suction Line) Connection	.35
42119-2	$\frac{5}{16}$" O. D. Flare Outlet (Suction Line) Connection	.35

Imperial Compound and Pressure Gauges



This compound gauge with drawn steel case registers 30 inches vacuum on one side and 60 pounds pressure on the other. Has square shank for wrench.

Can also be supplied 30 lbs. to 150 lbs.

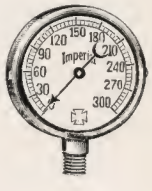
No. 122-C—Compound Gauge with 2" dial and with either 1/8" or 1/4" male iron pipe thread. Each.....**$1.20**

No. 122-C—with 2½" dial and with 1/8" or 1/4" male iron pipe thread. Each.....**$1.40**

This pressure gauge has a drawn steel case and is calibrated as follows: 0-30, 0-50, 0-100 , 0-150, 0-300 or 0-500. The 300 pound gauge is furnished unless otherwise specified. Has square shank for wrench.

No. 121-C—With 2" dial and with either 1/8" or 1/4" male iron pipe thread. Each.....**$0.90**

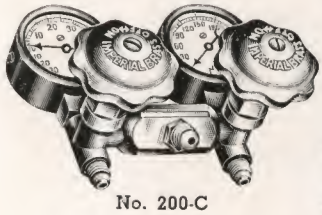
No. 121-C—With 2½" dial and with either 1/8" or 1/4" male iron pipe thread. Each.....**$1.10**



Imperial Charging and Testing Unit

This Charging and Testing Unit can be used for a variety of purposes and should be in every service man's kit. It is for use for:

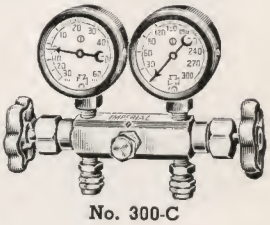
Charging liquid gas in high side.
Charging gas into low side.
Purging gas from gauge lines.
Purging air or gas from high side.
Charging oil in low side.
Testing low side for leaks.
Setting low side controls.
Setting expansion valves.



No. 200-C

No. 200-C—Imperial Charging and Testing Unit, each.....**$6.75**
Less Gauges.....**4.85**

No. 300-C—Imperial Charging and Testing Unit.....**5.15**
Less Gauges.....**3.05**



No. 300-C

Do you know that we carry Brass, Copper, Monel and Stainless Steel Wire Cloth?

Felts—Screens—Lead Washers

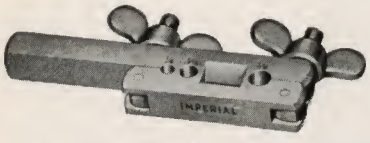
These screens, felts and washers are the same as those used in Imperial No. 304-C to 312-C and No. 55 Dehydrators illustrated on page 29 and No. 48-C strainer on page 30, also for our former No. 113-C Dehydrator.

FOR NO. 55-C DEHYDRATOR

No. 26904—Felt $\frac{13}{16}$"x$\frac{3}{16}$". List Price, per 100.....$2.30
No. 26905—Screen $\frac{13}{16}$". List Price, per 100..... 4.60
No. 26903—Lead Gasket 1$\frac{1}{16}$"x$\frac{7}{8}$". List Price, per 100..... 5.60

FOR NO. 48-C STRAINER AND 113-C, 304-C, 306, 309-C AND 312-C DEHYDRATORS

No. 29980—Felt 1¾"x¼". List Price, per 100.....$4.60
No. 29979—Screen 1¾". List Price, per 100..... 9.20
No. 32072—Lead Gasket 2"x$\frac{1}{16}$". List Price, per 100..... 12.40



Imperial Pinch-off Tool

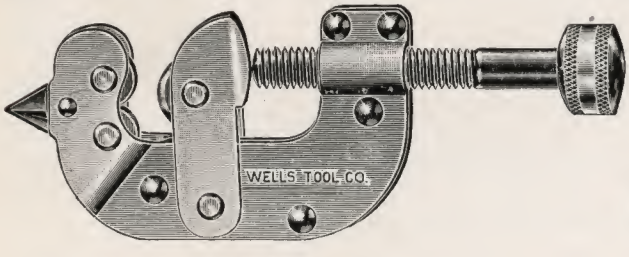
The Imperial Pinch-Off Tool will enable you to quickly pinch copper, brass and aluminum tubing so that no gas or liquid will pass this sealed part of the tubing.

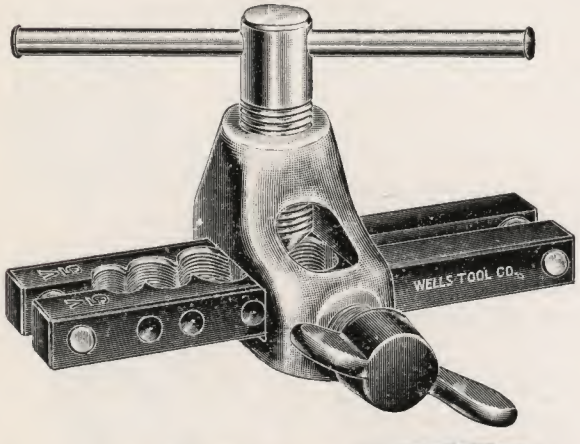
This makes it possible to disconnect the liquid or gas line while making repairs or installation without losing any of the refrigerant.

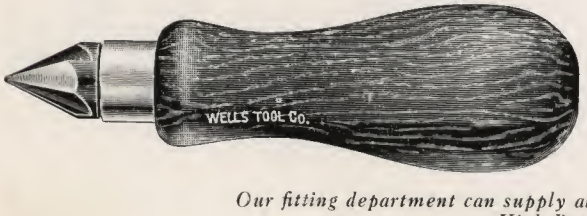
The tool will also open up the tubing when the unit is ready to operate. Takes ¼", ⅜" and ½" outside diameter copper tubing.

No. 106-F—Pinch-Off Tool, each.....**$1.85**

No. 105-F—Pinch-Off Tool is similar to No. 106-F, but has hex head bolts instead of bolts with wing nuts. It does not have the extra extension of the bar. For ¼", $\frac{5}{16}$" and ⅜". Each.....**$1.25**







Activated Alumina

This is a very efficient dehydrating agent. Will not react with refrigerants or decompose. Can be reactivated without losing its high efficiency. 4 to 8 mesh.

Furnished in sealed cans.

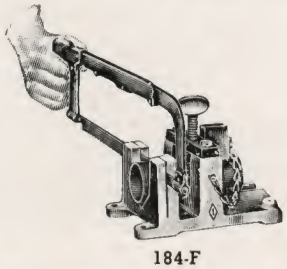
No. 236-C— 1 lb. can.....$0.59
No. 237-C— 5 lb. can..... 2.80
No. 238-C—25 lb. can..... 12.50

Reamer

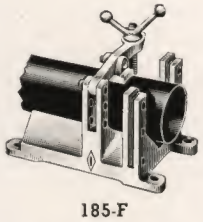
No. 207-F Reamer, each.....**$0.90**

Imperial Beaver Square-End Sawing Vises

A Perfect Right Angle Cut



184-F



185-F

Both types shown are very serviceable tools for cutting the larger sizes of pipe and tubing; the smaller one (No. 184-F, at left) also takes tubing as small as ⅛". The cut is made at a perfect right angle, and the holding pressure is so applied that the tubing cannot be crushed, marred or flattened at any point. Made with renewable steel inserts.

No. 184-F—Sawing Vise, ⅛" to 2".....**$5.00**
No. 185-F—Sawing Vise, 1½" to 4".....**15.00**

Wells Tube Cutters

$\frac{3}{16}$ to ⅝

For Cutting Copper or Brass Tubing

PRICES

No. 5—Tube Cutters for cutting $\frac{3}{16}$ to ⅝" tubing, net wt. ½ lb.....**$1.75**
No. 115—Display Carton with **4** Tube Cutters, shipping wt. 2½ lbs...**7.00**
Extra Cutter Wheels.....each **.35**

Wells Flaring Tool for Copper Tubing

Garage Size—For Flaring the end of $\frac{3}{16}$ to ⅜ Copper Tubing

All parts are always together.

No loose parts to be lost or mislaid.

PRICES

No. 105—For $\frac{3}{16}$, ¼, $\frac{5}{16}$, ⅜ Copper Tubing, net wt. 13 oz.....**$1.75**
No. 123—Display Carton with **4** Flaring Tools, net wt. 3¼ lbs..... **7.00**

Wells Hand Countersink

PRICES

No. 107—⅝" diameter Countersink, shipping wt. 3 oz..... each **$.50**
No. 137—Display Carton with **4** Countersinks, shipping wt. 12 oz.....**$2.00**

Our fitting department can supply all your wants in Pipe, Compression, S. A. E., Parker, High Duty, Arco, and other fittings.

Imperial Charging Line

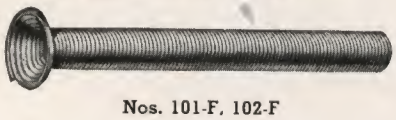
1—Interlocking Brass core.
2—Durable Compound Covering.
3—Braided Fabric outer covering.
4—¼" SAE Brass connection compressed on to the tube.

	List Each
No. 268-FT—12" Overall Length	$1.50
No. 269-FT—18" Overall Length	1.90
No. 270-FT—24" Overall Length	2.30

Imperial Charging Line With Copper Tubing Extensions

	List Each
No. 271-FT—24" Overall Length	$2.00
No. 272-FT—30" Overall Length	2.50
No. 273-FT—36" Overall Length	3.00

Imperial Tube Bender



Nos. 101-F, 102-F

A much needed tool is the new Imperial Tube Bender which makes it a simple matter to bend tubing by hand to any desired shape without collapsing the tube.

The Tube Bender is an especially prepared spring wire coil furnished in six sizes to take ¼, 5/16, ⅜, 7/16, ½ and ⅝ inch outside diameter copper or brass tubing. The springs are Cadmium plated to prevent rusting and the belled end assures ease in removing from tubing after bend has been made.

No. 101-F—Tube Bender (Set of six)	$2.10 per set
No. 102-F—¼" Bender	0.25 each
No. 102-F—5/16" Bender	.30 each
No. 102-F—⅜" Bender	.35 each
No. 102-F—7/16" Bender	.40 each
No. 102-F—½" Bender	.45 each
No. 102-F—⅝" Bender	.50 each

Imperial Inside Bending Spring

No. 302-F—Inside Bending Spring

A method of tube bending that is used as an alternative to the one shown above is applied by inserting the prepared spring wire coil into the tube. It is thoroughly effective in preventing any collapse or crimping of the tube.

This type is furnished in 3 sizes, to take ⅜", ½" and ⅝" outside diameter copper or brass tubing. Overall length of bender is 6 feet.

For ⅜" O.D. Tubing $0.55 Each
½" O.D. Tubing .60 Each
⅝" O.D. Tubing 1.20 Each
Longer length bending springs can be furnished.

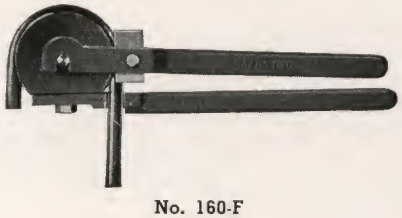
For each additional foot beyond the standard 6 foot length add:
For ⅜"..... $0.10 per foot
½"..... .10 per foot
⅝"..... .25 per foot

No. 98-C—RATCHET WRENCH

This ratchet wrench has been especially designed for refrigeration work. Has hardened steel ratchet and handle, and fits ¼" valve stems. It is a tool every installation and service man should have.

No. 98-C—Ratchet Wrench. Each	$0.50
No. 123-C—Ratchet Wrench. Each	0.90

Tube Bender

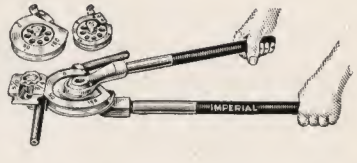


No. 160-F

Cat. No.	O. D. Tube	Radius	Weight	Price
160-F	⅜"	1½"	2¾ lbs.	$ 4.50
160-F	½	1½	3¼	5.00
160-F	⅝	2¼	8	7.50
160-F	¾	2¾	10	15.00

Imperial Heavy-Duty Tube Bending Tool

Pat. No. 1,852,515

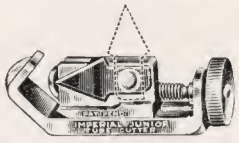


This heavy-duty, easy-operating tube bender is used for bending ⅜", ½", ⅝" and ¾" O. D. copper, brass or aluminum tubing by simply changing the mandrel and adjusting the block. The long leverage and adjustable operating lever makes it possible to apply considerable force without effort, and so avoid jerks and sudden strains, which might cause injury to the tubing. It is not necessary to make the bend in one continuous sweep of the operating lever. This lever is removable and adjustable, so that the most convenient position for easy operation can be maintained throughout the bend. Even the smallest deflections are made with perfect accuracy in the heaviest tubing. The bender is marked showing 90° and 180° positions and can be used to make right or left-hand bends. It is provided with a tube holder which keeps the tube from shifting. The tube can be easily removed from the bender, which can be held in a vise if so desired. The handles are removable, making it easy to pack in a small space. Approximate weight, 18 lbs.

No. 360-F—Imperial Heavy-Duty Bending Tool. List..... $39.50

We have special catalogues on Bunting Bushings, Van Dorn Tools, Parker and Imperial Fittings, Gears, etc. Ask us for one.

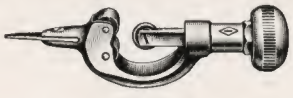
Imperial Junior Tube Cutter



A smaller sized tube cutter, for use on tubing of the same metals as the larger type. Takes all sizes from 3/16-inch to and including 3/4-inch outside diameter. Makes a quick, clean right-angle cut without the least flattening of the tube.

No. 127-F—Junior Tube Cutter, each.....**$1.25**

No. 174-F Imperial Tubing Cutter



This is a new tubing cutter equipped with two rollers and a rounded type of handle which makes cutting extremely easy. It is designed to take both soft and hard pipe or tubing.

No. 174-F—Imperial Tube Cutter. Price, each.....**$2.75**

No. 204-F Imperial Tube Cutter

For cutting hard or soft tubing.

7/8" to 2 1/4" O. D. Price, each.....**$4.95**

Nos. 94-F, 104-F, 96-F, 97-F

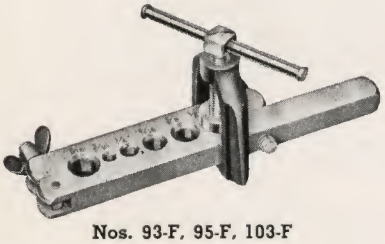
Imperial Tube Cutter

No. 94-F takes all sizes of tubing from 1/8" to and including 5/8" outside diameter. Price, each.....**$2.25**

No. 104-F takes tubing from 1/8" to and including 1" outside diameter, being especially adapted for cutting brass tubing for plumbing installations. It is the same as No. 94-F excepting that it does not have the reamer which is not necessary when working with the larger sizes of tubing. Price, each.....**$3.50**

No. 96-F—Extra Cutting Wheels, each.....**$.25**

No. 97-F—Extra Reamer Blades for 94-F. Price, each.....**$.25**



Nos. 93-F, 95-F, 103-F

Imperial Flaring Tool

Furnished in three (3) sizes:

No. 93-F—Flares 3/16", 1/4", 5/16", 3/8", 7/16" and 1/2" Outside Diameter Tubing and is especially adapted for automotive and electrical refrigeration work. Price, each.....**$3.00**

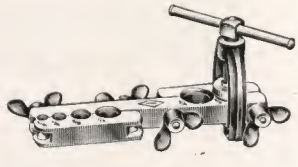
No. 95-F—Flares 1/4", 5/16", 3/8", 1/2" and 5/8" Outside Diameter Tubing and is used by electrical refrigeration installation and service men. Price, each.....**$4.00**

No. 103-F—Flares 3/4", 7/8" and 1" Outside Diameter Tubing and is especially desirable for use in plumbing installations of brass water pipe, etc. Price, each.....**$5.00**

No. 175-F Flaring Tool

This is a new combination flaring tool which, with its new design, will flare copper tubing quickly and easily. New improved features make flaring of large diameter and hard tubing easy.

No. 175-F—Imperial Flaring Tool for 3/16", 1/4", 3/8", 1/2", 5/8" and 3/4" O. D. Tubing. Price.....**$4.85** each

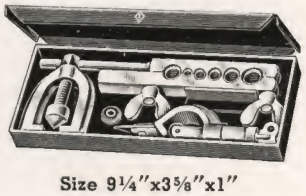


Flaring and Cutting Tool Kit

This kit has the necessary tools to quickly and properly cut and flare copper, brass, block tin and lead tubing. Consists of the Imperial Flaring Tool, Imperial Tubing Cutter, one extra cutting wheel, all packed in steel box.

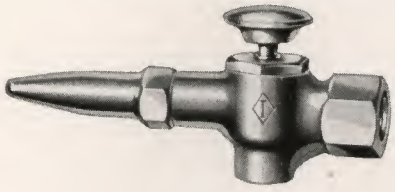
No. 125-F—Flaring and Cutting Tool Kit consists of: 1—No. 93-F Flaring Tool; 1—No. 94-F Tubing Cutter; 1—No. 96-F Extra Cutting Wheel.....Price, each **$5.50**

No. 126-F—Flaring and Cutting Tool Kit consists of: 1—No. 95-F Flaring Tool; 1—No. 94-F Tubing Cutter; 1—No. 96-F Cutting Wheel.....Price, each **$6.50**



Size 9 1/4"x3 5/8"x1"
Weight, 3 lbs.

Imperial Air Nozzle



For use on compressed air lines for blowing dust, dirt and moisture out of cracks. etc. Has ¼" female iron pipe thread.

No. 42-A—Air Nozzle. Each.....**$1.50**

Imperial Blow Gun

No. 41-A

This Blow Gun (Pistol grip type) is needed in every shop for cleaning gasoline and oil lines, blowing away chips, filings, dust, and dirt. Operates on compressed air.

Price Each.....**$2.50**

Imperial Soldering and Brazing Outfit

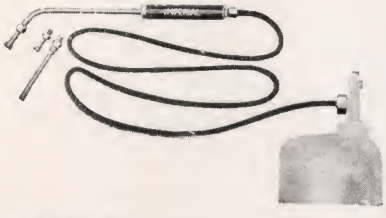
For use with Acetylene

The torch of this ideal outfit burns acetylene and air, the tips drawing in the necessary oxygen from the atmosphere, making the operating cost extremely low.

Tips E and F are for brazing, while J is a soldering iron. Tip G is designed for radiator soldering or where a tip is needed for those hard-to-get-at places.

The tank connection fits the small automobile acetylene light (Presto) tank, but can be used on large size cylinders by means of an adapter fitting. The amount of gas is regulated by the needle shut-off valve.

No. 30 OUTFIT



No. 30 Outfit consists of the same as No. 31, except it does not have J tip and the Shut-Off Valve. Price.....**$4.50**

No. 31 OUTFIT

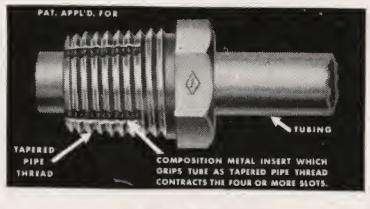
No. 31 Outfit consists of:

4 tips
1 Torch
6 Feet of hose and connections.

Price.....**$7.00**

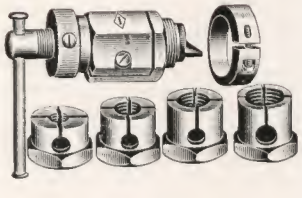
Imperial One Piece Tube Coupling

The one-piece adapter takes the place of the conventional two-piece coupling. Can be used with Bundy, Steel, Brass, Copper, Aluminum, Nickel Tubing and Iron Pipe.



No. 59-F

Tube	Pipe	Price Per C	Tube	Pipe	Price per C
3/16"	1/8"	$ 12.25	1/2	1/2	$ 71.00
1/4	1/4	16.65	5/8	3/4	111.10
5/16	1/4	20.00	3/4	3/4	155.60
3/8	3/8	35.50	7/8	1	225.00
7/16	3/8	53.35	1	1 1/4	360.00



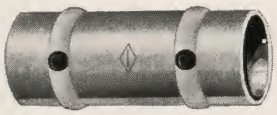
Imperial Rethreading and Refacing Tool

The tool comes complete with collar to hold the die. Dies are made up for ¼", ⅜", ½" and ⅝" S. A. E. Fittings.

No. 198-F—Rethreading and Refacing Tool only.....**$6.85** each
No. 200-F—Set of four dies ¼", ⅜", ½" and ⅝" sizes.....**$3.80** per set
No. 201-F—Dies only. Sizes ¼", ⅜", ½" and ⅝".....**$1.00** each size
No. 202-F—Replacement Cutter.....**$.75** each

Imperial Solder Fittings

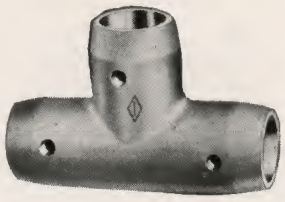
(Licensed under Streamline Patents Nos. 1,770,852, 1,776,502, 1,890,998)



No. 42-S COUPLING

Copper to Copper

O. D. Tube	List Price Per 100
¼ "x¼ "	$ 5.00
5/16"x5/16"	5.50
5/16"x¼ "	5.50
⅜ "x⅜ "	6.00
⅜ "x5/16"	6.00
⅜ "x¼ "	7.50
½ "x½ "	8.00
½ "x⅜ "	8.00
½ "x5/16"	9.00
½ "x¼ "	9.00
⅝ "x⅝ "	11.00
⅝ "x½ "	11.00
⅝ "x⅜ "	11.00
⅝ "x¼ "	11.00
¾ "x¾ "	12.00
¾ "x⅝ "	12.00
¾ "x½ "	12.00
⅞ "x⅞ "	15.00
⅞ "x¾ "	15.00
⅞ "x⅝ "	15.00
⅞ "x½ "	15.00
1 "x1 "	20.00
1 "x ¾"	24.00
1 "x ⅝"	24.00
1⅛"x1⅛"	20.00
1⅛"x1 "	20.00
1⅛"x ⅞"	20.00
1⅛"x ¾"	20.00
1¼"x1¼"	24.00
1¼"x1 "	28.00
1¼"x ¾"	28.00
1¼"x ⅝"	28.00
1⅜"x1⅜"	24.00
1⅜"x1⅛"	24.00
1⅜"x ⅞"	24.00
1½"x1½"	28.00
1½"x1¼"	32.00
1½"x1 "	32.00
1⅝"x1⅝"	28.00
1⅝"x1⅜"	28.00
1⅝"x1⅛"	28.00
2 "x2 "	46.00
2 "x1½"	46.00
2⅛"x2⅛"	46.00
2⅛"x1⅝"	46.00
2⅛"x1⅛"	46.00



No. 44-S TEE

Copper to Copper to Copper

When ordering tees, specify ends beginning with the left, then right, then the branch.

O. D. Tube	List Price Per 100
3/16"x3/16"x3/16"	$17.00
¼ "x¼ "x¼ "	17.00
5/16"x5/16"x5/16"	20.00
5/16"x5/16"x¼ "	20.00
⅜ "x⅜ "x⅜ "	20.00
⅜ "x⅜ "x5/16"	20.00
⅜ "x⅜ "x¼ "	20.00
⅜ "x¼ "x⅜ "	20.00
⅜ "x¼ "x¼ "	20.00
⅜ "x⅜ "x½ "	25.00
½ "x½ "x½ "	25.00
½ "x½ "x⅜ "	25.00
½"x ½"x 5/16"	25.00
½"x ½"x ¼"	25.00
½"x ⅜"x ½"	25.00
½"x ⅜"x ⅜"	25.00
½"x ⅜"x ¼"	25.00
½"x ¼"x ½"	25.00
⅝"x ⅝"x ⅝"	28.00
⅝"x ⅝"x ¼"	28.00
½"x ½"x ⅝"	28.00
⅝"x ⅝"x ⅜"	28.00
⅜"x ⅜"x ⅝"	28.00
⅝"x ⅝"x ½"	28.00
⅝"x ½"x ⅝"	2^ 00
⅝"x ½"x ½"	28.00
¾"x ¾"x ¾"	60.00
¾"x ¾"x1⅛"	105.00
¾"x ¾"x ⅝"	72.00
¾"x ¾"x ½"	72.00
¾"x ¾"x ⅜"	72.00
¾"x ¾"x ¼"	72.00
¾"x ⅝"x ¾"	72.00
¾"x ⅝"x ⅝"	72.00
¾"x ⅝"x ½"	72.00
¾"x ⅝"x ⅜"	72.00
¾"x ½"x ¾"	72.00
¾"x ½"x ⅝"	72.00
¾"x ½"x ½"	72.00
¾"x ⅜"x ¾"	72.00
⅝"x ⅝"x ¾"	72.00
⅞"x ⅞"x ⅞"	60.00
⅞"x ⅞"x ⅝"	72.00
⅞"x ⅞"x ½"	72.00
⅞"x ⅞"x ⅜"	72.00
⅞"x ⅞"x ¼"	72.00
⅞"x ⅝"x ⅞"	72.00
⅞"x ⅝"x ⅝"	72.00

O. D. Tube	List Price Per 100
⅞"x ⅝"x ½"	$ 72.00
⅞"x ½"x ⅞"	72.00
⅞"x ½"x ⅝"	72.00
⅞"x ⅜"x ⅞"	72.00
⅝"x ⅝"x ⅞"	72.00
½"x ½"x ⅞"	72.00
1" x1" x1"	95.00
1" x1" x1⅝"	150.00
1" x1" x ¾"	105.00
1" x1" x ⅝"	105.00
1" x1" x ½"	105.00
1" x1" x ⅜"	105.00
1" x1" x ¼"	105.00
1" x ¾"x1"	105.00
1" x ¾"x ¾"	105.00
1" x ¾"x ⅝"	105.00
1" x ¾"x ½"	105.00
1" x ⅝"x1"	105.00
1" x ⅝"x ¾"	105.00
1" x ⅝"x ⅝"	105.00
1" x ½"x1"	105.00
¾"x ¾"x1"	105.00
⅝"x ⅝"x1"	105.00
1⅛"x1⅛"x1⅛"	95.00
1⅛"x1⅛"x ⅞"	105.00
1⅛"x1⅛"x ⅝"	105.00
1⅛"x1⅛"x ½"	105.00
1⅛"x1⅛"x ⅜"	105.00
1⅛"x1⅛"x ¼"	105.00
1⅛"x ⅞"x1⅛"	105.00
1⅛"x ⅞"x ⅞"	105.00
1⅛"x ⅞"x ⅝"	105.00
1⅛"x ⅝"x1⅛"	105.00
1⅛"x ⅝"x ⅞"	105.00
1⅛"x ⅝"x ⅝"	105.00
1⅛"x ½"x1⅛"	105.00
⅞"x ⅞"x1⅛"	105.00
⅝"x ⅝"x1⅛"	105.00
1¼"x1¼"x1¼"	106.00
1¼"x1¼"x1"	118.00
1¼"x1¼"x ¾"	118.00
1¼"x1¼"x ⅝"	118.00
1¼"x1¼"x ½"	118.00
1¼"x1¼"x ⅜"	118.00
1¼"x1¼"x ¼"	118.00
1¼"x1" x1¼"	118.00
1¼"x1" x1"	118.00
1¼"x1" x ¾"	118.00
1¼"x1" x ⅝"	118.00
1¼"x1" x1½"	118.00
1¼"x ¾"x1¼"	118.00
1¼"x ¾"x1"	118.00
1¼"x ¾"x ¾"	118.00
1¼"x ⅝"x1¼"	118.00
¾"x ¾"x1¼"	118.00
1" x1" x1¼"	118.00
1⅜"x1⅜"x1⅜"	106.00
1⅜"x1⅜"x1⅛"	118.00
1⅜"x1⅜"x ⅞"	118.00
1⅜"x1⅜"x ⅝"	118.00
1⅜"x1⅜"x ⅜"	118.00
1⅜"x1⅛"x1⅜"	118.00
1⅜"x1⅛"x1⅛"	118.00
1⅜"x1⅛"x ⅞"	118.00
1⅜"x1⅛"x ⅝"	118.00

No. 44-S TEE (Cont'd)

O. D. Tube	List Price Per 100
1⅜"x ⅞"x1⅜"	$118.00
1⅜"x ⅞"x1⅛"	118.00
1⅜"x ⅞"x ⅞"	118.00
1⅜"x ⅝"x1⅜"	118.00
1⅛"x1⅛"x1⅜"	118.00
⅞"x ⅞"x1⅜"	118.00
1½"x1½"x1½"	140.00
1½"x1½"x1¼"	150.00
1½"x1½"x1"	150.00
1½"x1½"x ¾"	150.00
1½"x1½"x ⅝"	150.00
1½"x1½"x ½"	150.00
1½"x1¼"x1½"	150.00
1½"x1¼"x1¼"	150.00
1½"x1¼"x1"	150.00
1½"x1¼"x ¾"	150.00
1½"x1" x1½"	150.00
1½"x1" x1¼"	150.00
1½"x1" x1"	150.00
1½"x1" x ¾"	150.00
1½"x ¾"x1½"	150.00
1½"x ¾"x1¼"	150.00
1½"x ¾"x1"	150.00
1½"x ¾"x ¾"	150.00
1½"x ⅝"x1½"	150.00
1¼"x1¼"x1½"	150.00
1" x1" x1½"	150.00
1⅝"x1⅝"x1⅝"	140.00
1⅝"x1⅝"x1⅜"	150.00
1⅝"x1⅝"x1⅛"	150.00
1⅝"x1⅝"x ⅞"	150.00
1⅝"x1⅝"x ⅝"	150.00
1⅝"x1⅜"x1⅝"	150.00
1⅝"x1⅜"x1⅜"	150.00
1⅝"x1⅜"x1⅛"	150.00
1⅝"x1⅜"x ⅞"	150.00
1⅝"x1⅛"x1⅝"	150.00
1⅝"x1⅛"x1⅜"	150.00
1⅝"x1⅛"x1⅛"	150.00
1⅝"x ⅞"x1⅝"	150.00
1⅝"x ⅞"x1⅜"	150.00
1⅝"x ⅝"x1⅝"	150.00
1⅜"x1⅜"x1⅝"	150.00
1⅛"x1⅛"x1⅝"	150.00
2" x2" x2"	220.00
2" x2" x1½"	245.00
2" x2" x1¼"	245.00
2" x2" x1"	245.00
2" x2" x ¾"	245.00
2" x2" x ⅝"	245.00
2" x1½"x2"	245.00
2" x1½"x1½"	245.00
2" x1½"x1¼"	245.00
2" x1½"x1"	245.00
2" x1½"x ¾"	245.00
2" x1¼"x2"	245.00
2" x1¼"x1½"	245.00
2" x1¼"x1¼"	245.00
2" x1¼"x1"	245.00
2" x1" x2"	245.00
2" x1" x1½"	245.00
2" x1" x1¼"	245.00
2" x1" x1"	245.00
2" x ¾"x2"	245.00
2" x1½"x1½"	245.00
2" x1½"x1¼"	245.00
2" x1½"x1"	245.00
2" x1¼"x1¼"	245.00
2" x1¼"x1"	245.00
2" x1" x1"	245.00
1½"x1½"x1½"	245.00
1½"x1½"x1¼"	245.00
1½"x1½"x1"	245.00
1½"x1¼"x1¼"	245.00
1½"x1¼"x1"	245.00
1½"x1"x1"	245.00
1¼"x1¼"x1¼"	245.00
1¼"x1¼"x1"	245.00
1¼"x1"x1"	245.00
1"x1"x1"	245.00

O. D. Tube	List Price Per 100
2" x1" x1½"	$245.00
2" x1" x1¼"	245.00
2" x1" x1"	245.00
2" x ¾"x2"	245.00
1½"x1½"x2"	245.00
1¼"x1¼"x2"	245.00
2⅛"x2⅛"x2⅛"	220.00
2⅛"x2⅛"x1⅝"	245.00
2⅛"x2⅛"x1⅜"	245.00
2⅛"x2⅛"x1⅛"	245.00
2⅛"x2⅛"x ⅞"	245.00
2⅛"x1⅝"x2⅛"	245.00
2⅛"x1⅝"x1⅝"	245.00
2⅛"x1⅝"x1⅜"	245.00
2⅛"x1⅝"x1⅛"	245.00
2⅛"x1⅝"x ⅞"	245.00
2⅛"x1⅜"x2⅛"	245.00
2⅛"x1⅜"x1⅝"	245.00
2⅛"x1⅜"x1⅜"	245.00
2⅛"x1⅜"x1⅛"	245.00
2⅛"x1⅛"x2⅛"	245.00
2⅛"x1⅛"x1⅝"	245.00
2⅛"x1⅛"x1⅜"	245.00
2⅛"x1⅛"x1⅛"	245.00
2⅛"x ⅞"x2⅛"	245.00
1⅝"x1⅝"x2⅛"	245.00
1⅜"x1⅜"x2⅛"	245.00

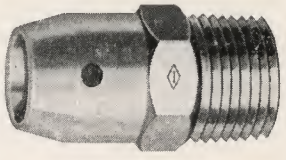
No. 46-S COUPLING

Copper to Inside I. P. S. Thread

O. D. Tube	I. P. T.	List Price Per 100
¼ "	⅛"	$ 10.00
¼ "	¼"	12.00
5/16"	⅛"	11.00
⅜ "	¼"	17.00
⅜ "	⅛"	14.00
½ "	⅜"	16.00
⅝ "	¾"	40.00
⅝ "	½"	22.00
⅝ "	⅜"	18.00
¾ "	¾"	40.00
¾ "	½"	30.00
⅞ "	¾"	40.00
1⅛ "	1 "	54.00
1⅜ "	1¼"	80.00
1⅝ "	1½"	113.00
2⅛ "	2 "	146.00

LEFT HAND PIPE THREAD

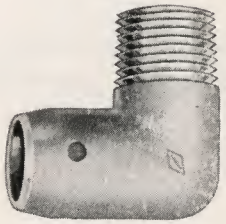
¼"	⅛"	$10.00
⅜"	⅛"	16.00



No. 48-S COUPLING

Copper to Outside I. P. S. Thread

O. D. Tube	I. P. T.	List Price Per 100
¼ "	⅜"	$ 14.00
¼ "	¼"	12.00
¼ "	⅛"	7.00
5/16"	⅜"	14.00
5/16"	¼"	12.00
5/16"	⅛"	7.00
⅜ "	½"	18.00
⅜ "	⅜"	16.00
⅜ "	¼"	14.00
⅜ "	⅛"	14.00
½ "	½"	18.00
½ "	⅜"	16.00
½ "	¼"	14.00
⅝ "	¾"	27.00
⅝ "	½"	18.00
⅝ "	⅜"	16.00
¾ "	1 "	40.00
¾ "	¾"	27.00
¾ "	½"	27.00
⅞ "	1 "	40.00
⅞ "	¾"	27.00
⅞ "	½"	27.00
1 "	1½"	67.00
1 "	1¼"	60.00
1 "	1 "	45.00
1 "	¾"	45.00
1⅛ "	1¼"	60.00
1⅛ "	1 "	45.00
1⅛ "	¾"	45.00
1¼ "	1¼"	67.00
1⅜ "	1½"	67.00
1⅜ "	1¼"	67.00
1⅜ "	1 "	56.00
1½ "	1½"	94.00
1½ "	1¼"	90.00
1⅝ "	1½"	94.00
1⅝ "	1¼"	90.00
1⅝ "	1 "	87.00
2 "	1½"	134.00
2⅛ "	2 "	134.00
2⅛ "	1½"	134.00
2⅛ "	1¼"	134.00



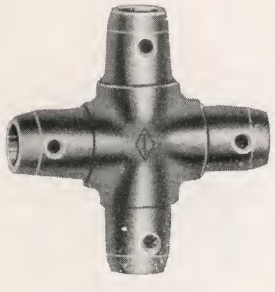
No. 49-S 90° ELBOW

Copper to Outside I. P. S. Thread

O. D. Tube	I. P. T.	List Price Per 100
3/16"	⅛"	$ 11.00
¼ "	⅜"	11.00
¼ "	¼"	11.00

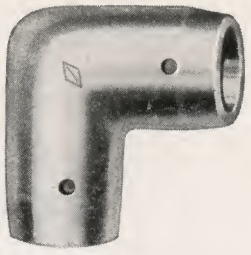
NO. 49-S 90° ELBOW (Cont'd)

O. D. Tube	I. P. T.	List Price Per 100
¼ "	⅛"	$ 11.00
5/16"	⅛"	12.00
⅜ "	⅜"	15.00
⅜ "	¼"	14.00
⅜ "	⅛"	14.00
½ "	½"	19.00
½ "	⅜"	17.00
½ "	¼"	17.00
⅝ "	¾"	45.00
⅝ "	½"	25.00
⅝ "	⅜"	25.00
¾ "	1 "	62.00
¾ "	¾"	45.00
¾ "	½"	45.00
⅞ "	¾"	45.00
⅞ "	½"	45.00
⅞ "	⅜"	45.00
1 "	1½"	100.00
1 "	1 "	62.00
1 "	¾"	62.00
1 "	½"	62.00
1⅛ "	1¼"	80.00
1⅛ "	1 "	62.00
1⅛ "	¾"	62.00
1⅛ "	½"	62.00
1¼ "	1½"	100.00
1¼ "	1¼"	80.00
1¼ "	1 "	80.00
1¼ "	¾"	80.00
1⅜ "	1¼"	80.00
1⅜ "	1 "	80.00
1⅜ "	¾"	80.00
1½ "	1½"	100.00
1½ "	1¼"	100.00
1½ "	1 "	100.00
1⅝ "	1½"	100.00
1⅝ "	1¼"	100.00
1⅝ "	1 "	100.00
2 "	2 "	180.00
2 "	1½"	180.00
2 "	1¼"	180.00
2⅛ "	2 "	180.00
2⅛ "	1½"	180.00
2⅛ "	1¼"	180.00



No. 52-S CROSS

O. D. Tube	List Price Per 100
¼"	$ 26.00
⅜"	30.00
½"	44.00
⅝"	65.00



No. 55-S 90° ELBOW

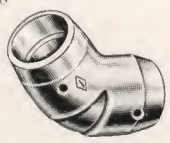
Copper to Copper

O. D. Tube	List Price Per 100
¼ "x ¼"	$11.00
5/16"x 5/16"	12.00
⅜ "x ⅜"	14.00
⅜ "x ¼"	14.00
½ "x ½"	17.00
½ "x ⅜"	17.00
½ "x ¼"	17.00
⅝ "x ⅝"	21.00
⅝ "x ½"	21.00
⅝ "x ⅜"	21.00
¾ "x ¾"	43.50
¾ "x ⅝"	43.50
¾ "x ½"	43.50
¾ "x ⅜"	43.50
⅞ "x ⅞"	43.50
⅞ "x ¾"	43.50
⅞ "x ⅝"	43.50
⅞ "x ½"	43.50
⅞ "x ⅜"	43.50
1 "x1 "	60.00
1 "x ¾"	60.00
1 "x ⅝"	60.00
1 "x ½"	60.00
1⅛ "x1⅛"	60.00
1⅛ "x1 "	60.00
1⅛ "x ¾"	60.00
1⅛ "x ⅞"	60.00
1⅛ "x⅝"	60.00
1⅛ "x½"	60.00
1¼ "x1¼"	75.00
1¼ "x1 "	75.00
1¼ "x ¾"	75.00
1¼ "x ⅝"	75.00
1¼ "x ½"	75.00
1⅜ "x1⅜"	75.00
1⅜ "x1⅛"	75.00
1¾ "x ⅞"	75.00
1⅜ "x ⅝"	75.00
1½ "x1½"	93.50
1½ "x1¼"	93.50
1½ "x1 "	93.50
1½ "x ¾"	93.50
1½ "x ⅝"	93.50
1⅝ "x1⅝"	93.50
1⅝ "x1⅜"	93.50
1⅝ "x1⅛"	93.50
1⅝ "x ⅞"	93.50
2 "x2 "	147.00
2 "x1½"	147.00
2 "x1¼"	147.00
2 "x1 "	147.00
2⅛ "x2⅛"	147.00
2⅛ "x1⅝"	147.00
2⅛ "x1⅜"	147.00
2⅛ "x1⅛"	147.00

No. 155-S WROUGHT TUBE 90° ELBOW

Copper to Copper

O. D. Tube	List Price Per 100
½ "x ½"	$ 16.00
⅝ "x ⅝"	20.00
⅝ "x½"	20.00
¾ "x ¾"	28.00
⅞ "x ⅞"	28.00
⅞ "x ⅝"	28.00
1 "x1 "	40.00
1⅛ "x1⅛"	40.00
1⅛"x ⅞"	40.00
1¼ "x1¼"	55.00
1⅜ "x1⅜"	55.00
1⅜ "x1⅛"	55.00
1½ "x1½"	70.00
1⅝ "x1⅝"	70.00
1⅝ "x1⅜"	70.00
2 "x2 "	100.00
2⅛ "x2⅛"	100.00
2⅛ "x1⅝"	100.00



No. 56-S 45° ELBOW

Copper to Copper

O. D. Tube	List Price Per 100
¾ "x ¾"	$ 56.00
1 "x1 "	60.00
1⅛ "x1⅛"	60.00
1¼ "x1¼"	75.00
1⅜ "x1⅜"	75.00
1½ "x1½"	93.50
1⅝ "x1⅝"	93.50
2 "x2 "	147.00
2⅛ "x2⅛"	147.00

No. 156-S WROUGHT TUBE 45° ELBOW

Copper to Copper

O. D. Tube	List Price Per 100
½ "x ½"	$ 16.00
⅝ "x ⅝"	20.00
⅞ "x ⅞"	23.00
1⅛ "x1⅛"	40.00
1⅜ "x1⅜"	55.00
1⅝ "x1⅝"	70.00
2⅛ "x2⅛"	100.00

No. 70-S 90° ELBOW

Copper to Inside I. P. S. Right Hand Thread

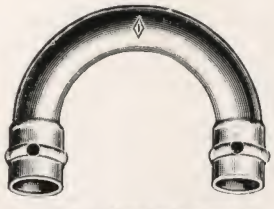
O. D. Tube	I. P. T.	List Price Per 100
¼"	⅛"	$ 10.50
⅜"	⅛"	13.50
½"	⅜"	45.00
⅝"	¾"	65.00
⅝"	½"	55.00
⅝"	⅜"	55.00

NO. 70-S 90° ELBOW (Cont'd)

O. D. Tube	I. P. T.	List Price Per 100
¾"	¾"	$ 55.00
¾"	½"	55.00
⅞"	¾"	55.00
⅞"	½"	55.00
⅞"	1 "	80.00
1 "	1 "	80.00
1 "	¾"	80.00
1 "	½"	80.00
1⅛"	1 "	80.00
1⅛"	¾"	80.00
1¼"	1¼"	100.00
1¼"	1 "	100.00
1⅜"	1¼"	100.00
1⅜"	1 "	100.00
1½"	1½"	135.00
1½"	1¼"	135.00
1⅝"	1½"	135.00
1⅝"	1¼"	135.00
2 "	1½"	180.00
2⅛"	1½"	180.00

LEFT HAND THREAD

¼"	⅛"	$11.00



No. 92-S RETURN BENDS

O. D. Tube	Centers	List Price Per 100
⅜"	1 ½ "	$15.00
½"	1 ½ "	18.00
½"	1 29/32"	18.00
½"	2 "	18.00
½"	3 "	19.00
½"	4 "	20.00
⅝"	1 9/16"	22.00
⅝"	2 ¼ "	22.00
⅝"	2 ½ "	22.00
⅝"	3 "	23.00
⅝"	3 ⅜ "	23.00
⅝"	4 15/16"	25.00
¾"	2 "	26.00
¾"	2 ⅛ "	26.00
¾"	2 ½ "	27.00
¾"	3 ⅜ "	28.00
¾"	4 "	29.00
¾"	4 13/16"	32.00
⅞"	3 ⅜ "	30.00

No. 95-SF TEE

Copper to Copper to Inside I. P. S.

O. D. Tube	I. P. T.	List Price Per 100
¼"	¼"	$ 30.00
⅜"	¼"	30.00
⅜"	⅛"	30.00
½"	⅜"	40.00
⅝"	⅜"	52.00
⅞"	1 "	106.00

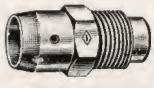
No. 95-SF TEE (Cont'd)

O. D. Tube	I. P. T.	List Price Per 100
⅞"	¾"	$100.00
⅞"	½"	100.00
1⅛"	1 "	112.00
1⅛"	¾"	112.00
1⅛"x¼"	1 "	112.00
1⅜"	1¼"	135.00
1⅜"	1 "	135.00

No. 95-SM TEE

Copper to Copper to Outside I. P. S.

O. D. Tube	I. P. T.	List Price Per 100
¼"	⅛"	$ 30.00
1 "	1¼"	106.00
1¼"	1½"	130.00
1½"	1½"	160.00
2 "	1½"	245.00



No. 138-S COUPLING

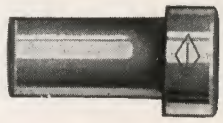
Copper to Flare

O. D. Tube Solder	O. D. Tube Flare	List Price Per 100
¼"	¼"	$12.00
⅜"	⅜"	15.00
⅜"	¼"	15.00
½"	½"	17.00
½"	⅜"	17.00
⅝"	⅝"	20.00
⅝"	½"	20.00
¾"	⅝"	30.00
⅞"	⅝"	30.00
1 "	⅞"	40.00

No. 139-S BUSHING

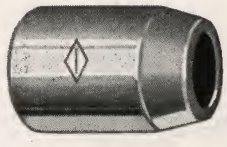
Fitting to O. D. Solder

O. D. Tube	List Price Per 100
⅜"x¼"	$ 8.00
½"x⅜"	9.50
½"x¼"	9.50
⅝"x¼"	13.50
⅝"x⅜"	13.50
⅝"x½"	13.50
¾"x½"	20.00
¾"x⅝"	20.00
⅞"x½"	20.00
⅞"x⅝"	20.00
⅞"x¾"	20.00
1⅛"x⅝"	26.00
1⅛"x¾"	26.00
1⅛"x⅞"	26.00
1⅜"x ⅝"	36.00
1⅜"x ¾"	36.00
1⅜"x ⅞"	36.00
1⅜"x1⅛"	36.00
1⅝"x ⅞"	52.00
1⅝"x1⅛"	52.00
1⅝"x1⅜"	44.00
2 "x1½"	52.00
2⅛"x1⅛"	48.00
2⅛"x1⅜"	48.00
2⅛"x1⅝"	52.00



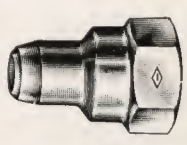
No. 639-S PLUG

O. D. Tube	List Price Per 100
¼"	$ 5.00
⅜"	6.00
½"	8.00
⅝"	11.00
¾"	15.00
⅞"	15.00
1 "	20.00
1⅛"	20.00
1¼"	24.00
1⅜"	24.00
1½"	60.00
1⅝"	60.00
2 "	90.00
2⅛"	90.00



No. 640-S CAP

O. D. Tube	List Price Per 100
¼"	$ 5.00
⅜"	6.00
½"	8.00
⅝"	11.00
¾"	15.00
⅞"	15.00
1 "	20.00
1⅛"	20.00
1¼"	24.00
1⅜"	24.00
1½"	60.00
1⅝"	60.00
2 "	90.00
2⅛"	90.00



No. 661-S COUPLING

Copper to Female SAE Thread

Female SAE	O. D. of Tube Solder	List Price Per 100
¼"	¼"	$10.00
⅜"	¼"	16.00
⅜"	⅜"	17.00
½"	⅜"	20.00
½"	½"	22.00
⅝"	½"	24.00
⅝"	⅝"	26.00
¾"	⅝"	40.00
¾"	¾"	45.00

ARCO FULL-FLOW WROUGHT COPPER FITTINGS

TEE
No. 200—Copper to Copper to Copper.

REDUCTION TEE
No. 200R—Copper to Copper to Copper.

90° ELBOW
No. 201—Copper to Copper.

90° REDUCTION ELBOW
No. 201R—Copper to Copper.

90° STREET REDUCTION ELBOW
No. 201S—Copper to Copper.

90° STREET ELBOW
No. 202—Copper to Copper.

90° PLAIN ELBOW
No. 203—Copper to Copper.

45° ELBOW
No. 204—Copper to Copper.

45° PLAIN ELBOW
No. 206—Copper to Copper.

45° STREET ELBOW
No. 205—Copper to Copper.

90° ELBOW
No. 220—Female Copper to Male I.P.S.

90° ELBOW
No. 221—Female Copper to Female I.P.S.

90° REDUCTION ELBOW
No. 221R—Female Copper to Female I.P.S.

COUPLING
No. 207—Copper to Copper.

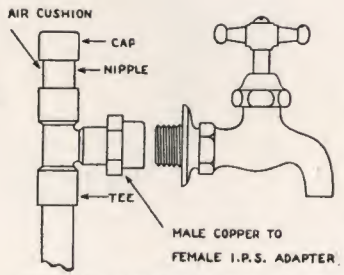
FEMALE REDUCTION COUPLING
No. 208—Copper to Copper.

MALE REDUCTION COUPLING
No. 209—Copper to Copper.

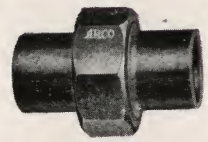
STOP AND WASTE
No. 211—Copper to Copper

STOP AND WASTE
No. 212—Female I.P.S. to Female Copper.

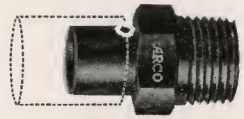
GATE VALVE
No. 222—Copper to Copper.



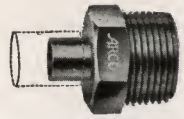
FIXTURE CONNECTION made with ARCO Wrought Copper Fittings.



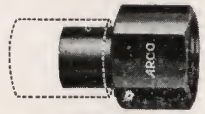
THREE PIECE THREADED UNION
No. 217—Copper to Copper.



ADAPTER
No. 216—Male Copper to Male I.P.S.

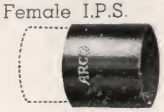


REDUCTION ADAPTER
No. 216R—Male Copper to Male I.P.S.



ADAPTER
No. 215—Male Copper to Female I.P.S.

REDUCTION ADAPTER
No. 215R—Male Copper to Female I.P.S.



CAP
No. 210

ARCO BRACKET
The Arco Special Bracket is used for making up drop-ear bracketed fittings. The Fitting is snapped in place and solder applied to the two wing sections, securing the Fitting to the bracket; simple, cheap and making every fitting in the jobber's or contractor's stock a bracketed fitting.

ADAPTER
No. 214—Female Copper to Male I.P.S.

REDUCTION ADAPTER
No. 214R—Female Copper to Male I.P.S.

RANGE BOILER FITTING
No. 223

ADAPTER
No. 213—Female Copper to Female I.P.S.

REDUCTION ADAPTER
No. 213R—Female Copper to Female I.P.S.

PIPE STRAP
No. 219

DROP EAR BRACKET
No. 218

ARCO FULL FLOW WROUGHT COPPER FITTINGS

†See note below.	Nominal Sizes	¼"	⅜"	½"	⅝"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"
No. 200	Tee, C.-C.-C.	$0.15	$0.16	$0.20	$0.25	$0.31	$0.44	$0.60	$0.80	$1.20	$1.60	$2.40	$3.20	$4.00
No. 200R.	Tee, Reduction, S.O.-C.-C.-C.	.20	.16	.20	.25	.31	.44	.60	.80	1.20	.....	.....	.....	.....
No. 200R.R.	Tee, Reducing, C.-C.-C.	.20	.....	.20	.....	.31	.44	.60	.80	1.20	.....	.....	.....	.....
No. 200T.	Tee, C.-C.-F.I.P.S.	.....	.16	.20	.....	.31	.....	.....	.....	.....	.....	.....	.....	.....
No. 201	Ell, C.-C.	.12	.13	.16	.20	.23	.32	.44	.56	.80	1.32	2.00	2.72	3.60
No. 201R.	Ell, Reduction, C.-C.	.....	.13	.16	.....	.23	.32	.44	.56	.80	.....	.....	.....	.....
No. 201S.	Ell, Street Reduction, C.-C.	.....	.....	.16	.....	.23	.32	.....	.....	.....	.....	.....	.....	.....
No. 202	Ell, Street, C.-C.	.12	.13	.16	.20	.23	.32	.44	.56	.80	.....	.....	.....	.....
No. 203	Ell, Male, C.-C.	.12	.13	.16	.20	.23	.32	.44	.56	.80	.....	.....	.....	.....
No. 204	45° Ell, C.-C.	.12	.13	.16	.20	.23	.32	.44	.56	.80	1.32	2.00	2.72	3.60
No. 205	45° Street Ell, C.-C.	.12	.13	.16	.20	.23	.32	.44	.56	.80	.....	.....	.....	.....
No. 206	45° Male Ell, C.-C.	.12	.13	.16	.20	.23	.32	.44	.56	.80	.....	.....	.....	.....
Nos. 207 & 207P.	Couplings, C.-C.	.06	.07	.09	.11	.12	.16	.20	.23	.37	.52	.68	1.04	1.20
No. 208	Coupling, Reduction, C.-C.	.....	.07	.09	.11	.12	.16	.20	.23	.37	.....	.....	.....	.....
No. 209	Bushing, C.-C.	.....	.07	.09	.11	.12	.16	.20	.23	.37	.52	.68	1.04	1.20
No. 210	Cap, C.-C.	.05	.07	.09	.10	.12	.16	.20	.23	.37	.52	.68	1.04	1.20
No. 211	Stop & Waste, C.-C.	.....	.72	.80	.....	.92	1.60	.....	.....	.....	.....	.....	.....	.....
No. 212	Stop & Waste, C.-F.I.P.S.	.....	.72	.80	.....	.92	1.60	.....	.....	.....	.....	.....	.....	.....
No. 213	Adapter, F.C.-F.I.P.S.	.11	.13	.15	.....	.20	.26	.40	.48	.72	1.04	1.60	2.00	2.80
No. 213R.	Adapter, Reduction, F.C.-F.I.P.S.	.13	.13	.15	.17	.20	.26	.40	.48	.72	.....	.....	.....	.....
No. 214	Adapter, F.C.-M.I.P.S.	.11	.13	.15	.....	.20	.26	.40	.48	.72	1.04	1.60	2.00	2.80
No. 214R.	Adapter, Reduction, F.C.-M.I.P.S.	.13	.13	.15	.17	.20	.26	.40	.48	.72	.....	.....	.....	.....
No. 215	Adapter, M.C.-F.I.P.S.	.11	.13	.15	.....	.20	.26	.40	.48	.72	.....	.....	.....	.....
No. 215R.	Adapter, Reduction, M.C.-F.I.P.S.	.13	.13	.15	.....	.20	.26	.....	.....	.....	.....	.....	.....	.....
No. 216	Adapter, M.C.-M.I.P.S.	.11	.13	.15	.....	.20	.26	.40	.48	.72	.....	.....	.....	.....
No. 216R.	Adapter, Reduction, M.C.-M.I.P.S.	.13	.13	.15	.....	.20	.26	.....	.....	.....	.....	.....	.....	.....
No. 217	Ground Joint Union, C.-C.	.....	.45	.50	.....	.60	.75	.90	1.25	1.50	4.40	6.92	11.16	14.48
No. 218	Drop Ear Bracket	.....	.05	.07	.....	.09	.12	.....	.....	.....	.....	.....	.....	.....
No. 219	Pipe Strap, Price per M	14.40	18.00	20.00	24.00	27.65	33.30	51.20	59.20	75.20	.....	.....	.....	.....
No. 220	Ell, F.C.-M.I.P.S.	.13	.14	.20	.....	.30	.40	.....	.....	.....	.....	.....	.....	.....
No. 221	Ell, F.C.-F.I.P.S.	.13	.14	.20	.....	.30	.40	.....	.....	.....	.....	.....	.....	.....
No. 221R.	Ell, Reduction, F.C.-F.I.P.S.	.....	.14	.20	.....	.30	.40	.....	.....	.....	.....	.....	.....	.....
No. 222	Gate Valve, C.-C.	.....	1.12	1.20	.....	1.40	1.92	2.56	3.60	5.20	.....	.....	.....	.....
No. 223	Range Boiler Fitting	.....	.....	.35	.....	.35	.....	.....	.....	.....	.....	.....	.....	.....
	Pipe Tool, Type L. or K	1.00	1.00	1.00	1.00	1.25	1.25	.....	.....	.....	.....	.....	.....	.....

† Prices based on largest outlet.

Nominal sizes are for Service Tubing and not outside diameters. For actual outside diameters see Service Tubing, page 39.

RETURN BENDS

No. 224

Size	Centers	
¼"	1½"	$0.12
⅜"	1½"	.15
⅜"	$1\frac{29}{32}$"	.15
⅜"	2"	.15
⅜"	3"	.16
⅜"	4"	.18
½"	$1\frac{9}{16}$"	.18
½"	2¼"	.18
½"	2½"	.18
½"	3"	.19
½"	3⅜"	.19
½"	$4\frac{15}{16}$"	.20
⅝"	$1\frac{9}{16}$"	.23
¾"	2¼"	.24

SOLDER

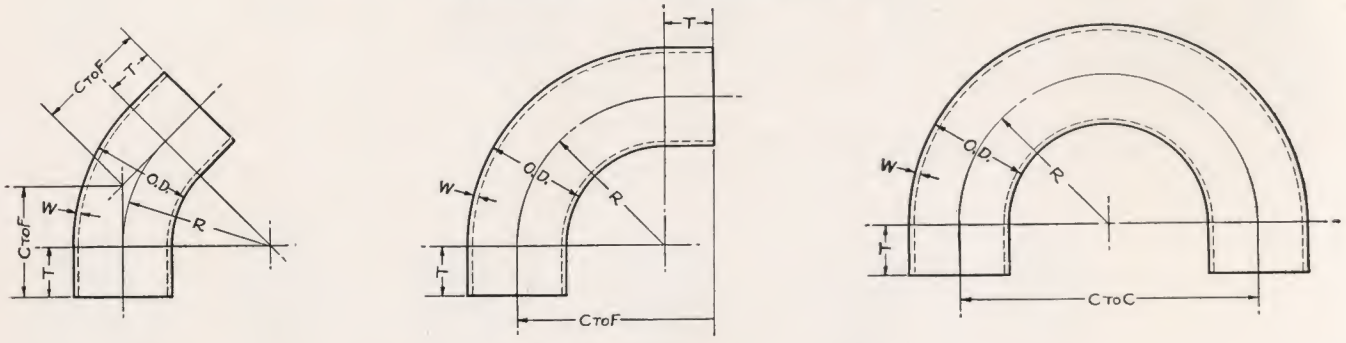
Arco A.
(For Normal Service)
1 lb. Spool
5 lb. Coil

Arco B. (For High Temperature Service)
1 lb. Spool
5 lb. Coil

Soldering Paste
2 oz. Can
1 lb. Can
10 lb. Can

Ask for special folder showing available reduction sizes.

Seamless Copper Tube-Turns



Seamless copper tube-turns are 45 degree and 90 degree elbows and 180 degree return bends. They are made from seamless copper tubing by a patented process that insures uniform wall thickness at all points. There is no thinning or stretching of the back wall, nor thickening or buckling of the inner wall. The cross section is round. The tangents are cold rolled on the ends after the bends are formed, resulting in hardened ends that remain round and undamaged in normal handling.

Tube-turns are usually installed by means of soldered joints. The straight pipe is belled or flared out, then the straight tangent of the tube-turn is pushed in as far as it will go, and then soldered or sweated into place.

Standard Stock Sizes

STRAIGHT END TYPE

Nominal Size Inch	Outside Diameter Inches	Wall Thickness Inch	Wall Thickness Stubs Ga.	Tangent Radius 45° and 90° "T"	Tangent Radius 45° and 90° "R"	Center to Face Inches 45°	Center to Face Inches 90°	Approx. Wght. Each 90°	List Price Each 45°	List Price Each 90°
1½	1.5	.065	16	1	2¼	1 11/16	3¼	.5	$ .70	$ .70
2	2.0	.083	14	1 5/32	3	2¼	4 5/32	1.3	1.00	1.00
2½	2.5	.083	14	1 7/16	3¾	2 13/16	5 3/16	1.8	1.65	1.65
3	3.0	.090	13—	1⅝	4½	3⅜	6⅛	3.0	2.50	2.50
3½	3.5	.083	14	1¾	5¼	3 15/16	7	4.5	3.40	3.40
4	4.0	.095	13	2	6	4½	8	6.0	4.50	4.50
5	5.0	.109	12	2½	7½	5⅝	10	10.0	9.50	9.50
6	6.0	.122	11+	3	9	6¾	12	16.0	14.50	14.50
7	7.0	.109	12	3	9	6¾	12	16.5	20.00	20.00
8	8.0	.109	12	3	12	8	15	22.8	20.00	20.00
10	10.0	.109	12	4	15	10 3/16	19	37.5	28.00	28.00
12	12.0	.109	12	4	18	11 7/16	22	51.2	42.00	42.00

BELLED END TYPE

Nominal Size Inch	Belled End O. D. Inch	Belled End I. D. Inch	Wall Thickness Inch	Wall Thickness Stubs Ga.	Radius 90° "R" Inches	Center to Face 90° Inches	Length of Bell Inches	List Price Each 45°	List Price Each 90°
1½	1.760	1.630	.065	16	2¼	3¼	1	$ .70	$ .70
2	2.296	2.130	.083	14	3	4 5/32	1 5/32	1.00	1.00
2½	2.796	2.630	.083	14	3¾	5 3/16	1 7/16	1.65	1.65
3	3.310	3.130	.090	13—	4½	6⅛	1⅝	2.50	2.50
3½	3.796	3.630	.083	14	5¼	7	1¾	3.40	3.40
4	4.320	4.130	.095	13	6	8	2	4.50	4.50
5	5.348	5.130	.109	12	7½	10	2½	9.50	9.50
6	6.374	6.130	.122	11+	9	12	3	14.50	14.50

Outside Diameters are same as O. D. tube sizes; wall thicknesses are based on those customarily used in the various sizes.

Tangent length is ample to provide a long "slip" or overlap in the soldered joint, insuring tight, strong joints, free from leaks. Where flanges are used, the tangent length is ample for lapping.

In addition to the above list of standard sizes the factory is in a position to supply, subject to minimum quantity requirements, tube-turns made of other diameter or wall thickness, standard pipe sizes or extra heavy pipe sizes. In addition to copper, tube-turns may also be obtained made of admiralty metal, aluminum, brass, inconel, monel, nickel, chrome nickel steels, silicon bronze, and other ferrous and non-ferrous alloys. Let us check your manufacturing requirements for the possible economical substitution of tube-turns in your plant.

Tube-Turn Spiral Coils

These spiral coils have the same uniform wall thickness found in tube-turns and can be produced on center to center dimensions of two to five times the diameter of the tubing. These coils are made to order and not carried in stock since there is no standard design. Let us check with you on the possibility of using these coils in your plant.

Stainless Steel in Sheets, Rods, Tubes, Wire and accessories ready to ship immediately.

Prest-O-Lite Plumbers' Outfits

A Prest-O-Lite Plumbers Outfit enables you to install the new copper pipe and fittings easily and quickly and with complete satisfaction to your customer. It is the outfit recommended by manufacturers as the ideal source of heat for turning out a workmanlike, trouble-free job. It saves you time and labor and insures a perfect, permanent connection in every joint of a piping system.

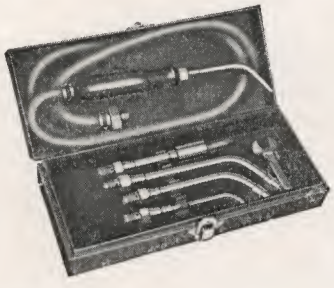
The flame of a Prest-O-Lite Torch is small but intense. It may be focused exactly where it is needed, enabling you to apply the heat evenly and without overheating. For soldering connections close to walls and in confined spaces, a Prest-O-Lite Torch is invaluable, because its flame is narrow and concentrated. There is no danger of melting solder from a connection while heating the fitting adjacent.

Prest-O-Lite Gas Tanks

Style	Length	Diam.	Rated Capacity	Average Weight	Tank Price	Exchange Price
A	22 "	7¼"	70 Cu. Ft.	45 Lbs.	$19.00	$3.95
B	20 "	6 "	40	30	12.50	2.75
E	16 "	6 "	30	25	10.80	2.15
MC	13½ "	4 "	10	10	6.50	1.10

Prices are F.O.B. Prest-O-Lite Plants. Tank prices include tank, initial charge of gas, and tank key. Exchange prices are for the gas only.

Prest-O-Lite 5 in 1 Outfit



The **5-in-1 Outfit** consists of:

5-in-1 Torch Handle with:
1. Stem for very fine soldering
2. Stem for light soldering and brazing
3. Stem for medium soldering and brazing
4. Stem for heavy soldering and brazing
5. Soldering copper

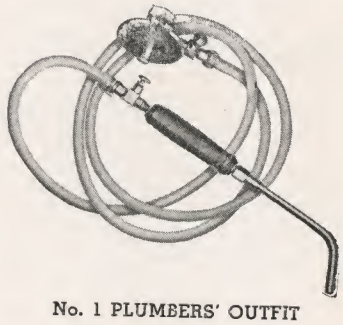
6 ft. 7/32-in. hose with hose clamps
Union for attaching to Prest-O-Lite A, B or E Tank
Union for attaching to Prest-O-Lite MC Tank
Wrench
Substantial Metal Carrying Case

Price.....**$9.00**

Best results are obtained by using the Prest-O-Lite A-6053 10-lb. Pressure Regulator, which furnishes gas at a constant, even and correct pressure.

A-6053 Pressure Regulator.....**$5.00**

Prest-O-Lite Plumbers' Outfits—Nos. 1 and 2



No. 1 PLUMBERS' OUTFIT

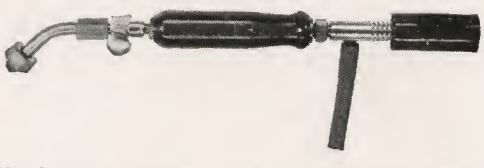
No. 1 Plumbers' Outfit consists of a Prest-O-Lite Torch with a needle valve, 15 ft. of hose and a 10-lb. pressure regulator. A mixer in the torch stem maintains exactly the right proportions of acetylene and air, thus insuring maximum flame intensity. The needle valve, which permits the gas to be turned on and off at the torch handle, adds to the convenience of the outfit. The pressure regulator holds the gas at uniform working pressure. This insures economical gas consumption. Price.....**$8.50**

No. 2 Plumbers' Outfit includes a Prest-O-Lite Torch and extra stem, 15 ft. of hose, and a tank union. The torch is the same as the one in the No. 1 Outfit, except that it has no needle valve.

Price.....**$5.00**

Tank sold separately.

The Prest-O-Lite Halide Leak Detector



The Prest-O-Lite Halide Leak Detector is a positive, sensitive device for locating leaks in refrigerating and air conditioning units. During recent years, the non-combustible halide gases—such as F-12 (Freon), F-21, F-114 and Carrene—have found a wide and varied use as refrigerants for both domestic and industrial installations. These gases are relatively odorless, tasteless and colorless. These properties render necessary a quick and sure method of locating leaks while cooling units are being installed and also during servicing. The Prest-O-Lite Halide Leak Detector was developed to meet these requirements. It is designed for use with the non-combustible halide gases and must not be used for locating leaks of combustible gases.

Prest-O-Lite Halide Leak Detector Outfit (Part No. O1P93), complete with 3 ft. of Z-54 7/32-in. red fabric Hose, special MC Tank Adaptor and Part No. L-6341 Hose Nipple.....**$6.50**

Ask for complete Prest-O-Lite Catalog.

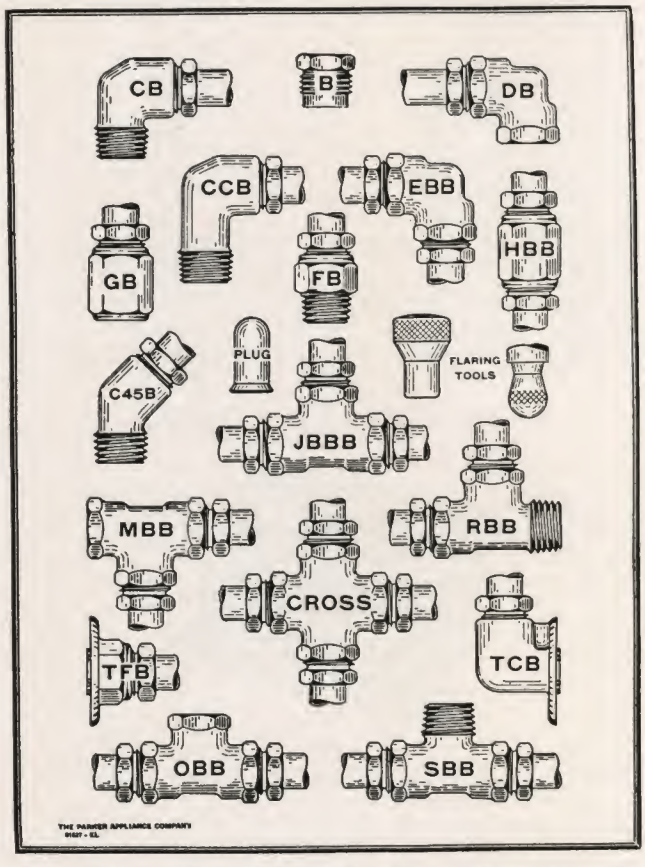
Our business is locally owned. The management wants all our customers to visit our warehouse and meet them personally.

Parker Tube Couplings

The exclusive features of Parker Tube Couplings are Minimum Metal content, Full tube support, Balanced design, Remains tight under all conditions, Can be used repeatedly without loss of efficiency and the Moderate flare angle eliminates splitting of tube in flaring which also permits the use of hard drawn tube if desired.

Parker Tube Couplings are manufactured in Standard Brass, Heavy Brass, Steel, Monel Metal and Duralumin. STANDARD BRASS IS REGULAR STOCK.

B	—Tube Nut	**J**	—Tube Tee
C	—Male I.P.T. Elbow	**M**	—Female I.P.T. Run Tee
C-45°	—Male I.P.T. Elbow 45°	**O**	—Female I.P.T. Side Tee
CC	—Male I.P.T. Elbow Long	**R**	—Male I.P.T. Run Tee
D	—Female I.P.T. Elbow	**S**	—Male I.P.T. Side Tee
E	—Tube Elbow	**TF**	—Tank Flange Connector
F	—Male I.P.T. Connector	**TC**	—Tank Flange Elbow
G	—Female I.P.T. Connector	**+**	—Cross
H	—Tube Union		Plug



WHEN ORDERING, SPECIFY:

SIZE—By the number of sixteenth of an inch in the outside diameter of the Tube.

SHAPE—By the shape letter according to the chart of Standard Shapes.

NUT—By the letter "B" repeated according to the number of nuts required.

Other shapes, threads or combinations not listed as Standard may usually be obtained from factory if volume warrants.

STANDARD BRASS

Shapes Only—Without Nuts—Price Each

Size No.	2	3	4	5	6	7	8	9	10	12	14	16	18	20	24	28	32
Tube O. D.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
I. P. Size	1/8	1/8	1/8	1/8	1/4	1/4	3/8	3/8	1/2	3/4	3/4	1	1	1 1/4	1 1/2	1 1/2	2
B	$ .15	$ .15	$ .15	$ .16	$ .17	$ .29	$ .33	$ .42	$ .47	$ .60	$ .75	$ .90	$1.00	$1.10	$1.50	$2.15	$2.50
C	.25	.25	.25	.27	.29	.46	.51	.64	.71	.90	1.05	1.20	1.70	2.15	2.80	3.60	4.25
CC	.27	.27	.27	.29	.32	.49	.54	.68	.76	.95	1.11	1.27	1.75	2.25	2.92	3.75	4.40
CCC	.29	.29	.29	.32	.35	.53	.58	.73	.82	1.02	1.20	1.35	1.82	2.40	3.10	3.95	4.60
C-45°	.25	.25	.25	.27	.29	.46	.51	.64	.71	.90	1.05	1.20	1.70	2.15	2.80	3.60	4.25
D	.27	.27	.27	.29	.33	.52	.58	.70	.78	.98	1.15	1.35	1.90	2.50	3.30	4.15	4.95
E	.29	.29	.29	.31	.35	.54	.60	.72	.80	1.00	1.20	1.40	1.95	2.50	3.30	4.15	4.95
F	.22	.22	.22	.24	.26	.45	.50	.61	.68	.86	.95	1.10	1.65	2.15	2.80	3.60	4.25
G	.23	.23	.23	.25	.28	.47	.52	.63	.70	.89	1.00	1.15	1.65	2.15	2.80	3.60	4.25
H	.25	.25	.25	.28	.33	.58	.65	.79	.88	1.10	1.25	1.40	1.95	2.50	3.30	4.15	4.95
J	.35	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
M	.35	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
O	.35	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
R	.35	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
RS	.35	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
S	.35	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
TC	.30	.30	.30	.32	.35	.57	.63	.77	.85	1.07	1.25	1.44	1.95	2.55	3.35	4.30	5.10
TC-45°	.30	.30	.30	.32	.35	.57	.63	.77	.85	1.07	1.25	1.44	1.95	2.55	3.35	4.30	5.10
TF	.27	.27	.27	.29	.31	.54	.60	.73	.82	1.03	1.14	1.31	1.95	2.55	3.35	4.30	5.10
Y*	....	.35	.35	.40	.55	.94	1.05	1.30	1.45	1.85	2.20	2.45	2.60	2.75	3.75	4.50	5.50
Cross	.58	.58	.58	.62	.70	.98	1.20	1.44	1.60	2.00	2.40	2.80	3.80	5.00	6.60	8.30	9.90

For information on additional shapes, sizes, weights, and types of fittings and a complete line of valves, see note on page 117.

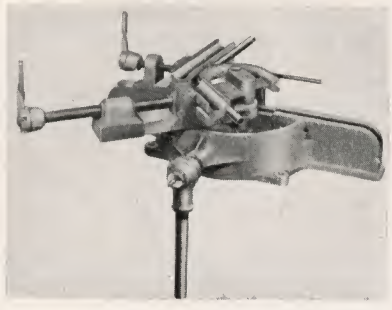
Many of your engineering and technical problems may be solved by using the Parker line of Valves and Fittings. Let us check over your requirements with you.

In addition to the Brass Fittings and tube working tools listed here, the Parker line includes a complete line of valves manufactured in Bronze, Steel, Stainless Steel, and Dural. Bulletin No. 38 illustrates this line. If interested please ask for it.

The fittings illustrated here may be duplicated in Steel, Stainless Steel, and Dural. Ask for special catalogue covering same.

Parker Bulletin No. 41 is available giving complete technical data on tubing made from various metals and alloys.

Production Tube Bender

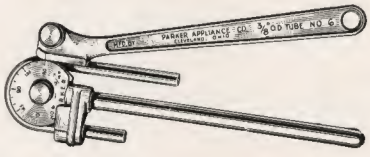


Production Tube Bender Model G—No. 824

For bending thin wall copper, aluminum—steel—nickel or other tube to short radii—quickly and efficiently without flattening, kinking or distorting and without filling the tube—PARKER production Tube Benders meet every aeronautical production requirement. Indispensable where any quantity of tubing is to be bent.

Price complete with all accessories for tubing sizes:
8, 10, 12, 14, 16, 18, 20 and 24.....**$318.00**

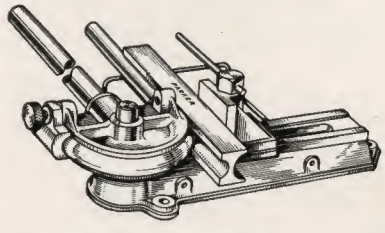
Hand Tube Bender



Copper or aluminum tube may be quickly bent to reasonably short radii without filling the tube or using a mandrel with PARKER hand tube benders. The tube is quickly clamped and bent by hand. The bender may be clamped to the tube or removed instantly without sliding over the full length of the tube —these benders are designed for use on the job without vise or other accessories.

Tube Size	2	3	4	5	6
Price Each	$2.00	$2.25	$2.50	$2.75	$2.95

Bench Tube Bender



Parker Bench Benders are designed to bend tube from No. 8 (½" O.D.) to No. 24 (1½" O.D.) and to a radius from 1½" to 8". This is a general utility tool for bending tube with a sufficiently large radius so that no mandrel is required.

No. 820 including slide blocks and bending radius for sizes ½", ⅝", ¾" and ⅞" complete.....**$60.00**

No. 412 including slide blocks and bending radius for sizes ¼", ⅜", ½", ⅝" and ¾" complete.....**$40.00**

All other sizes quoted as extra equipment.

Hammer Type Flaring Tools

For use with PARKER TUBE COUPLINGS of sizes No. 8 to No. 32 inclusive.

Hammer type flaring tools for Standard or triple tube couplings are recommended for use with all tube No. 8 size (½" O. D.) to No. 32 (2" O. D.) tubes and particularly for heavy wall or hard drawn tube such as used for high pressures and building installations.

Standard Hammer Type Flaring Tools

Tube Size	8	9	10	12	14	16	18	20	24	28	32
No. 281 St.	$1.80	$1.90	$2.00	$2.25	$2.60	$3.00	$3.50	$4.00	$4.75	$6.00	$7.50
No. 283 Triple	1.80	1.90	2.00	2.25	2.60	3.00	3.50	4.00	4.75	6.00	7.50

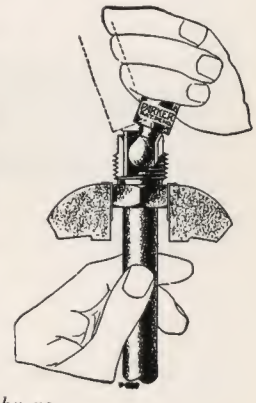
Specify whether standard or triple type is desired.

Ball Type Flaring Tools

Parker Ball Type Flaring Tools are recommended for aircraft installation of soft copper and aluminum tube, Nos 4 to 12—the hammer type style for Nos. 12 to 32, and the die blocks (Fig. No. 289) for Nos. 2 to 6 inclusive.

Tube Size	4	5	6	7	8	9	10	12
No. 280 Std.	$1.00	$1.15	$1.25	$1.50	$1.75	$2.00	$2.50	$3.00
No. 284 Triple	1.00	1.15	1.25	1.50	1.75	2.00	2.50	3.00

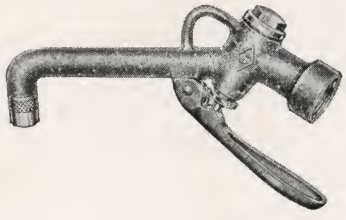
Specify whether standard or triple type is desired.



"Ohio" the valve known to all who want the best. Complete stock of Ohio Valves carried by us.

Radiator Filler Faucet

Convenient—Durable—Economical

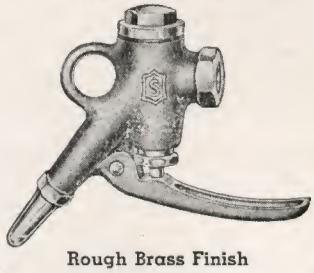


¾ Inch Hose Thread—Rough Brass or Rough Nickel Plate Finish.

List Price, each.....**$1.25**

Air Nozzle

Designed for Maximum Utility, Air Economy and Operating Convenience

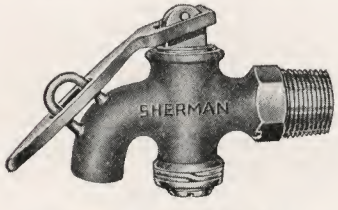


	Rough Brass Finish	
Iron Pipe Size	¼"	⅜"
List Price, Each	**$1.50**	**$1.75**

Barrel Faucets

SOLID BRASS HANDLES

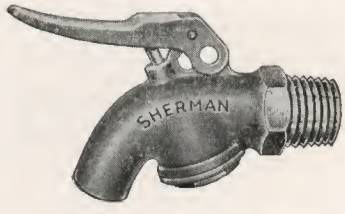
GROUND KEY—LOCK LEVER



Sizes—⅝x¾ I. P. and ¾x¾ I. P.

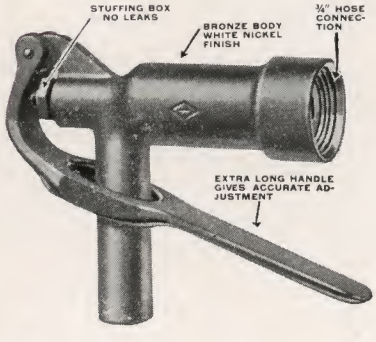
List Price, Each.....**$1.00**

SELF-CLOSING—LOCK LEVER



¾ Inch Size Only—Rough Brass Finish.

List Price, Each.....**$1.00**



Imperial Radiator Water Faucet—No. 281G

Has larger water capacity, assuring quick filling of radiator. This faucet is non-leaking, made of Bronze, White Nickel finish and threaded for ¾" hose connection.

Price Each.....**$1.25**

Genuine Sette for Self-Closing Faucet—No. 261G

For oil, Gasoline, Kerosene, Alcohol and other liquids in Steel Drums and Barrels. Guaranteed leak-proof. The **Sette** is the only self-closing faucet that has a metal to metal seat.

¾" I. P. Thread. Each.....**$1.00**

Brass Hose Clamps

Stock No.	**1**	**2**	**3**
Hose Size O. D.	**3/8**	**7/16**	**1/2**
No. in Pkge.	100	100	100

Brass Fixture Connectors

No. in Pkge..... 500

FOR QUALITY

Sherman Diamond Nozzle

Patented

SPRAY—STRAIGHT STREAM—SHUT OFF

Every nozzle ripidly inspected, tested under heavy pressure and guaranty tag attached before packing.

Each dozen packed in handsome counter display box of heavy leather-finished stock.

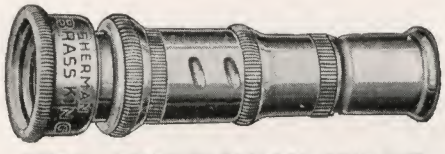
¾" size only. Plain or nickel plated. 12 dozen packed in special shipping case. Shipping weight per gross approx. 55 lbs.

List Price, Each.....**$.50**

FOR PRICE

Brass King

Patented

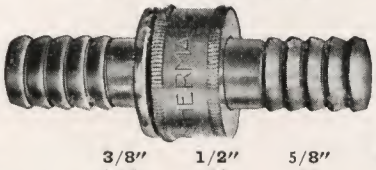


SPRAY—STRAIGHT STREAM—SHUT OFF

List Price, Each.....**$.35**

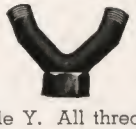
Sherman Hose Couplings

HEAVY WROUGHT BRASS



Hose Size	3/8"	1/2"	5/8"	3/4"	1"
List, Each.....	$.15	.20	.25	.25	.40

Brass Fittings for Spray Outfits



Angle Y. All threads ¼ I. P. S. Screws on top of spray rod permitting use of two nozzles, one on each male end. Male ends are tipped at 30° angle to throw spray down into the blossoms.

Angle Y

List, Each.....**$.35**

Spray Hose Coupling

⅜" Hose x ¾" Thread or
½" Hose x ¾" Thread
List, Each.....**$.65**

Sherman Hose Clamps

HEAVY WROUGHT BRASS—CAN NEVER RUST

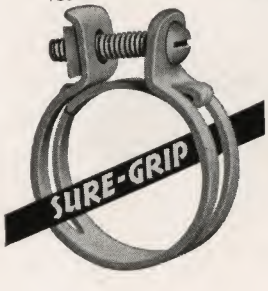
A World Standard

Wrought brass.

Size	Ply	Inside Diam. of Clamp Inches	No. of Clamps Per Carton	Wt. Gross Lbs.	Per Doz.
½	3	15/16	144	5½	$ 0.80
½	4	1 1/32	144	6½	.84
⅝	3	1 1/16	144	6½	.90
¾	2	1 3/32	144	6½	.90
¾	3	1 3/16	144	6½	.90
¾	4	1 1/4	144	7¼	.90
1	3	1 11/32	72	18	2.00
1	4	1 17/32	48	19¾	2.00
1¼	3	1 21/32	48	22¼	2.50
1¼	4	1 13/16	48	25	2.50
1½	4	2 1/16	36	32	3.00
2	4	2 9/16	24	39	4.00
2½	4	3 1/16	12	50	7.00
3	4	3 15/16	12	53	10.00

Steam Hose Clamp

Size	Ply	Inside Diam. of Clamp Inches	No. of Clamps Per Carton	Wt. Gross Lbs.	Per Doz.
¾	3	1 7/16	72	18	$2.00
¾	4	1 17/32	48	20	2.00
1	3	1 5/8	48	21	2.50
1	4	1 21/32	48	21	2.50
1¼	3	1 15/16	36	30	3.00
1¼	4	1 31/32	36	30	3.00
1½	3-4	2 7/32	36	33	3.50
1½	5	2 13/32	24	35	4.00
2	3-4	2 11/16	24	38	5.50
2	5	2 7/8	12	50	6.50
2½	3-4	3 1/2	12	60	8.50
2½	5	3 9/16	12	66	9.50

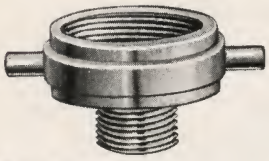


Sure Grip

Wrought Steel. Galvanized.

Trade Size Inch	Ply	†Inside Diameter of Clamp Inch	No. of Clamps Per Carton	Weight Per Gross	List Per Dozen
⅜	2	9/16	144	4.2	$ .32
⅜	3	5/8	144	4.2	.32
⅜	4	11/16	144	4.5	.32
½	2	¾	72	5.1	.32
½	3	⅞	72	5.5	.32
½	4	15/16	72	5.5	.32
⅝	3	1	72	7.3	.36
¾	3	1 1/8	72	7.8	.36
¾	4	1 3/16	72	8.0	.36
¾	5	1 1/4	72	8.4	.36
1	3	1 3/8	36	9.3	.72
1	4	1 7/16	36	13.2	.72
1	5	1 1/2	36	13.5	.72
1¼	3	1 11/16	36	19.	1.50
1¼	4	1 13/16	36	20.	1.50
1¼	5	1 7/8	36	21.5	1.50
1½	3	2	36	22.	$1.80
1½	4	2 1/8	36	22.	1.80
1½	5	2 3/16	36	30.	1.80
1¾	3	2 1/4	24	40.	2.10
2	3	2 7/16	24	42.	2.40
2	4	2 9/16	24	43.	2.40
2	5	2 11/16	24	45.	2.40
2¼	4	2 13/16	24	51.	3.30
2½	3	2 15/16	24	52.	4.20
2½	4	3	24	53.	4.20
2½	5	3 1/8	24	54.	4.20
2¾	4	3 1/4	12	63.	5.10
3	3	3 7/16	12	63.	6.00
3	4	3 1/2	12	64.	6.00
3	5	3 5/8	12	67.	6.00

†Sizes ⅜" to ¾" when clamp is open ½" between ears; larger sizes, when open ¾".

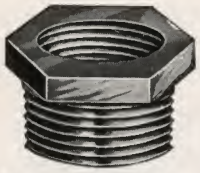


Hose Reducers

Hose Thread Both Ends

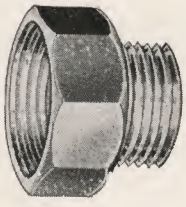
Size Inch	1x¾	1¼x¾	1¼x1	1½x¾	1½x1	1½x1¼	2x¾	2x1	2x1¼
Price, Each	.54	.67	.83	.96	.96	1.00	1.08	1.17	1.33

Size Inch	2x1½	2½x¾	2½x1	2½x1¼	2½x1½	2½x2	3x2	3x2½
Price, Each	1.50	1.67	1.83	1.92	2.00	2.17	2.50	3.00



Hose Bushings

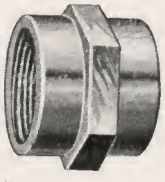
Male and Female Hose Thread



Octagon Pattern Hose Reducer

(California Pattern)

1x¾" only—Octagon shape, rough brass finish. A high grade low priced reducer.
List Price, Each.....**$.54**



Double Female Nipples

Hose Thread one end, Taper Iron Pipe Thread, the other

Size, inches	½	¾	1
List, Each	.55	.55	.82

Hose Nipples

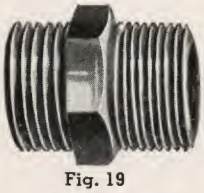


Fig. 19

Male

Unless otherwise specified, will be furnished Hose Thread one end and Taper Iron Pipe Thread the other.

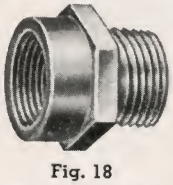


Fig. 18

Male and Female

Unless otherwise specified, will be furnished Hose Thread male end and Taper Iron Pipe Thread female end.

Note—When ½" nipples are ordered, they will be sent ½" Taper Iron Pipe and ¾" Hose Thread, unless otherwise specified.

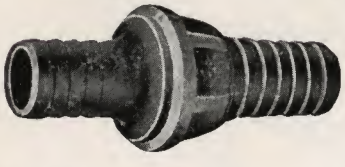
List Prices. Male or Male and Female

Size Inch	½	¾	1	1¼	1½	2	2½	3	3½	4
Price, Each	.29	.29	.42	.75	.83	1.17	2.33	3.33	4.17	6.25

Hose Caps

Female Hose Thread

Size Inch	¾	1	1¼	1½	2	2½	3	3½	4
Price, Each	.33	.50	.67	.83	1.25	2.00	2.58	3.25	3.58



Water Hose Couplings

⅜" to 1" inclusive, have beaded nut without lugs, to turn by hand. 1¼" to 2½" inclusive, have lugs on female swivel only. 3" size and larger have lugs on both male and female swivels.

Heavy Cast Brass—List Prices

Size Inch	½	¾	1	1¼	1½	2	2½	3
Price, Each	.20	.20	.37	.83	1.17	2.00	4.00	6.25

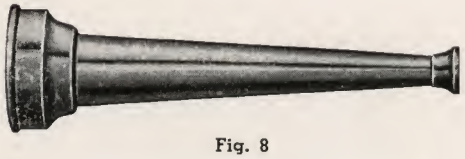


Fig. 8

Plain Hose Nozzles

Cast Brass

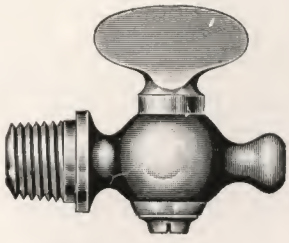
Our hose nozzles are carefully designed with the strength in the right place and are of excellent appearance. Full weight—beautifully finished.

Furnished with Hose or Iron Pipe Threads. ¾" and 1" sizes are packed in cartons.

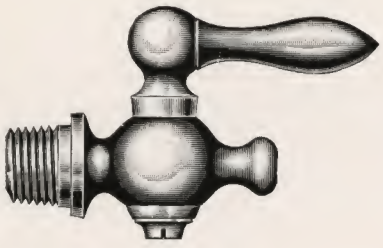
Size Inches	¾	¾	¾	1	1	1¼	1¼	1¼	1½
Length Inches	3	4	6	4	8	4¾	10	12	5¾
Discharge Inches	¼	¼	¼	5/16	5/16	⅜	⅜	⅜	7/16
Weight per dozen Pounds	2½	3	4	4	7¼	5	10½	15½	7½
*List Per Dozen	**$4.00**	**$5.00**	**$7.00**	**$5.00**	**$9.00**	**$12.00**	**$16.00**	**$18.00**	**$18.00**

Size Inches	1½	1½	2	2	2½	2½	2½	2½
Length Inches	10	12	6¾	12	7½	12	15	20
Discharge Inches	½	½	9/16	⅝	11/16	13/16	13/16	1
Weight per dozen Pounds	12	17	14	22	25	38	54	86
*List Per Dozen	**$20.00**	**$22.00**	**$26.00**	**$34.00**	**$37.40**	**$55.00**	**$65.00**	**$90.00**

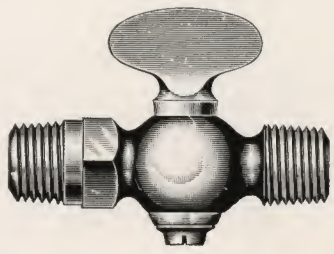
Air Cocks



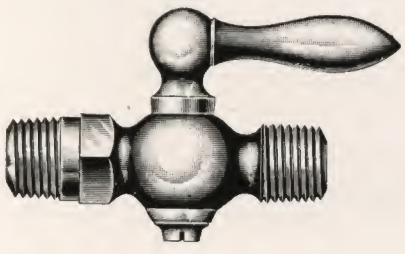
T. H. No....	6	7	8	9
Size In.....	⅛	¼	⅜	½
Price.....	.40	.45	.50	.60



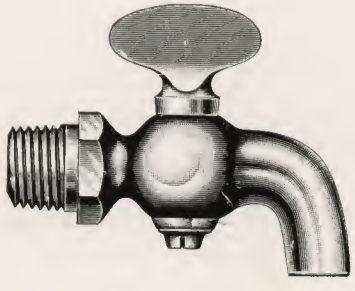
L. H. No.....	12	13	14	15
Size In.....	⅛	¼	⅜	½
Price.....	.55	.60	.65	.75



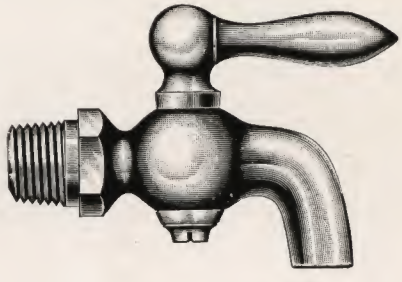
T. H. No.....	18	19	20	21
Size In.....	⅛	¼	⅜	½
Price.....	.55	.65	.75	.90



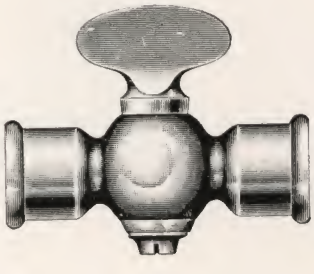
L. H. No.....	22	23	24	25
Size In.....	⅛	¼	⅜	½
Price.....	.70	.80	.90	1.05



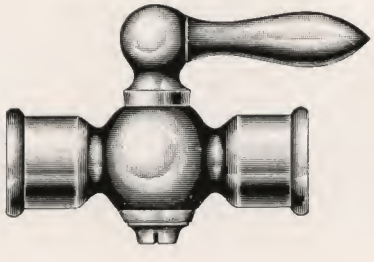
T. H. No....	27	27	28	33
Size In.....	⅛	¼	⅜	½
Price.....	.70	.80	.90	1.00



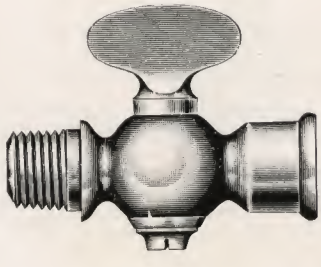
L. H. No.....	29	30	31	32
Size In.....	⅛	¼	⅜	½
Price.....	.85	.95	1.05	1.15



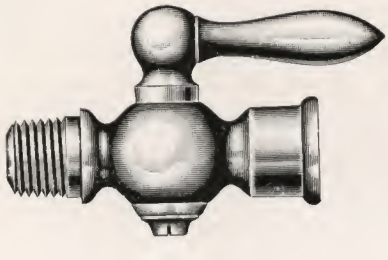
T. H. No....	37	38	39	39½
Size In.....	⅛	¼	⅜	½
Price.....	.65	.70	.85	1.00



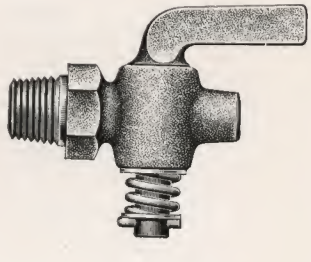
L. H. No.....	43	44	45	45½
Size In.....	⅛	¼	⅜	½
Price.....	.80	.85	1.00	1.15



T. H. No.....	40	41	42	42½
Size In.....	⅛	¼	⅜	½
Price.....	.75	.80	.90	1.05



L. H. No.....	46	47	48	48½
Size In.....	⅛	¼	⅜	½
Price.....	.90	.95	1.05	1.20



No.....	600	601	602	603
Size In.....	⅛	¼	⅜	½

See Imperial Nc. 41 to 44E, Page 94.

Our fitting department can supply all your wants in Pipe, Compression, S. A. E., Parker, High Duty, Arco, and other fittings.

Stainless Steel Valves

ALLEGHENY METAL

Regularly supplied in **ALLEGHENY METAL** or 18-8% Chromium-Nickel Stainless Steel. Can also be supplied in Allegheny Metal with Molybdenum, 25-12% Chromium-Nickel and other Allegheny corrosion and heat-resisting alloys to your requirements.

GATE VALVES

Screwed or Flanged. 125 Lbs. Working Pressure. Clamp Type.
Outside Screw and Yoke. Rising Wheel
Sizes: ½", ¾", 1", 1¼", 1½", 2", 2½", 3", 4".

150 Lbs. Working Pressure
Bolted Bonnet Type. Outside Screw & Yoke. Rising Stem.
Sizes: 2", 3", 4", 6", 8", and 10".

GLOBE, ANGLE AND CROSS VALVES

Screwed or Flanged
150 Lbs. Working Pressure
Union Bonnet Type. Outside Screw and Yoke.
Sizes: ½", ¾", 1", 1¼", 1½", and 2".

150 Lbs. Working Pressure
Bolted Bonnet Type. Outside Screw and Yoke.
Sizes: 2", 2½", 3", 4", 6", 8", and 10".

150 Lbs. Working Pressure
Union Bonnet Type. Inside Screw.
Sizes: ¼", ⅜", ½", ¾", 1", 1¼", 1½", and 2".

Sizes larger than 3" can be supplied usually in only Flanged Type.

"Y" VALVES

Flanged. Outside Screw and Yoke.
125 Lbs. Working Pressure. Bolted Body Type.
Sizes: 1", 1¼", 1½", 2", 2½", 3", and 4".

150 Lbs. Working Pressure. Bolted Bonnet Type.
Sizes: 2", 2½", 3", 4", 6", 8", and 10".

150 Lbs. Working Pressure. Screwed Bonnet Type.
End to End Screwed. Inside Screw.
Sizes: ¼", ⅜", ½", ¾", 1", 1¼", 1½", and 2".

CHECK VALVES

Horizontal or Swing Type. Screwed or Flanged.
150 Lbs. Working Pressure. Union Bonnet Type.
Sizes: ½", ¾", 1", 1¼", 1½", and 2".

150 Lbs. Working Pressure. Bolted Bonnet Type.
Sizes: 2", 2½", 3", 4", 6", 8", and 10".

PLUG COCKS (Square Head) STOP COCKS (Leaver or Tee Handle)

List Price Each

	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"
Spring Type (Female Thread)	$15.00	$16.00	$17.00	$19.00	$24.00	$30.00	$.....	$.....
"D" Washer Type (Female Thread)	.....	.....	.....	.....	29.00	32.00	45.00	65.00
Bibb Cocks (Male Thread)	.....	15.00	16.00	18.00	23.00	28.00	.....	.....

Ohio Brass Valves

The design of Ohio Brass Valves, scientifically developed during 40 years of Valve building, provides for an even distribution of the high-grade steam bronze.

The uniformity of its mixture is assured through the use of only new metals—scrap of any kind is never used. Supervision of experienced metallurgical chemists, assures maintenance of high quality standards.

Each part is finished to a nicety by the use of specially designed machining tools and gauges. Each part receives a very careful and minute inspection before being included in any assembly, and is then checked and tested under maximum pressures.

NEEDLE VALVES

Working Pressure 200 Lbs.

Brass Needle—Brass Seat

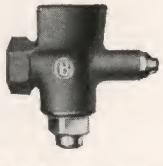
GLOBE

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
⅛	6	5.445	$1.20
¼	6	5.309	1.40
⅜	6	6.059	1.50
½	6	7.371	2.00

ANGLE

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
⅛	6	5.160	$1.20
¼	6	5.688	1.40
⅜	6	5.996	1.50
½	6	6.383	2.00

BLOW GUN



Air Gun List Prices

	⅛"	¼"	⅜"
No. 55—Air Gun with standard brass tip; or case-hardened steel, if specified	$1.65	$1.65	$1.90
No. 55-A—Extension tip (10-in. length)	2.40	2.40	2.65
No. 55-B—Flat tip	2.15	2.15	2.40
No. 55-C—Standard tip	1.65	1.65	1.90
No. 55-D—Button Head tip	1.65	1.65	1.90
No. 55-E—Bent tip (1½-in. length)	2.25	2.25	2.50
No. 55-F—Hose nipples, standard pipe threading	.50	.50	.50

No. 1 Line Globe and Angle Valves

Brass Disc. 125 Lb. Pressure

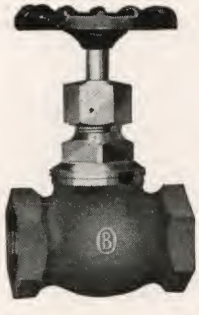
Rugged, long service giving Valves. Designed to withstand severe requirements without complaint.

	GLOBE				ANGLE		
Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each	Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
1/8	6	2.246	$ .72	1/8	6	2.226	$ .72
1/4	6	2.567	.72	1/4	6	2.535	.72
3/8	6	3.324	.77	3/8	6	3.292	.77
1/2	6	4.766	1.00	1/2	6	4.570	1.00
3/4	6	9.109	1.26	3/4	6	8.968	1.26
1	4	8.922	1.80	1	4	8.860	1.80
1 1/4	4	13.391	2.52	1 1/4	4	12.860	2.52
1 1/2	2	8.953	3.50	1 1/2	2	8.578	3.50
2	1	6.430	5.30	2	1	6.211	5.30
2 1/2	1	11.828	10.00	2 1/2	1	11.359	10.00
3	1	15.891	14.40	3	1	15.468	14.40

No. 2 Line Globe and Angle Valves

Brass Disc. Competition. 100 Lb. Pressure

The Ohio Brass No. 2 Line of Valves is essentially the same as the No. 1 Line. They are competition valves but are made without sacrificing the fine points of Ohio Brass manufacture.



	GLOBE				ANGLE		
Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each	Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
1/8	6	2.207	$ .72	1/8	6	2.222	$ .72
1/4	6	2.566	.72	1/4	6	2.473	.72
3/8	6	3.234	.77	3/8	6	3.238	.77
1/2	6	4.453	1.00	1/2	6	4.312	1.00
3/4	6	6.875	1.26	3/4	6	6.262	1.26
1	4	6.985	1.80	1	6	10.406	1.80
1 1/4	4	10.109	2.52	1 1/4	4	9.406	2.52
1 1/2	2	7.066	3.50	1 1/2	2	6.867	3.50
2	1	5.805	5.30	2	1	5.554	5.30
2 1/2	1	11,828	10.00	2 1/2	1	11.359	10.00
3	1	15.891	14.40	3	1	15.468	14.40

No. 3 Line Globe and Angle Valves

Low Pressure Composition Disc. 100 Lb. Pressure

The Composition Disc makes this valve serviceable on either hot or cold water lines. It is designed for low pressure work where a renewable composition disc would be more satisfactory than a brass disc valve.

	GLOBE				ANGLE		
Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each	Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
3/8	6	3.218	$ .92	3/8	6	3.250	$ .92
1/2	6	4.468	1.15	1/2	6	4.250	1.15
3/4	6	6.875	1.46	3/4	6	6.156	1.46
1	4	6.875	2.00	1	6	9.906	2.00

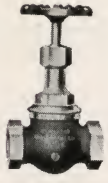
Buy from your local distributors as they carry stock for your immediate requirements.

No. 10 Line Globe and Angle Valves

Jenkins Type

Composition Disc. 150 Lb. W. S. Pressure

All parts of No. 10 Line Valves are interchangeable with corresponding sizes of Jenkins Bros. Standard Pattern Valves.

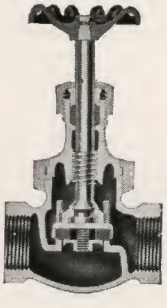


GLOBE				ANGLE			
Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each	Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
⅛	6	5.445	$ 1.10	⅛	6	5.160	$ 1.10
¼	6	5.309	1.10	¼	6	5.688	1.10
⅜	6	6.059	1.25	⅜	6	5.957	1.25
½	6	9.093	1.60	½	6	8.906	1.60
¾	4	9.343	2.20	¾	4	9.063	2.20
1	3	9.813	2.80	1	3	9.750	2.80
1¼	2	9.563	4.00	1¼	2	9.500	4.00
1½	1	6.750	5.50	1½	2	13.188	5.50
2	1	11.063	8.75	2	1	10.563	8.75
2½	1	17.250	15.75	2½	1	16,656	15.75
3	1	27.563	22.00	3	1	25,500	22.00

No. 11 Line, Union Bonnet Globe and Angle Valves

Standard Pattern—150 Lbs. Working Steam Pressure—O-B Composition Disc

Bronze parts are made of highest quality steam bronze. Bonnet Union Nut and Packing Nut are of malleable iron. Regularly fitted with O-B Composition Discs for steam service. Discs for cold water, air and other special services will be furnished if so ordered. Handwheel is made of malleable iron and is of the non-heating type.



GLOBE VALVES				ANGLE VALVES			
Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each	Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	5.309	$ 1.10	¼	6	5.688	$ 1.10
⅜	6	6.059	1.25	⅜	6	5.957	1.25
½	6	9.093	1.60	½	6	8.906	1.60
¾	4	9.343	2.20	¾	4	9.063	2.20
1	3	9.813	2.80	1	3	9.750	2.80
1¼	2	9.563	4.00	1¼	2	9.500	4.00
1½	1	6.750	5.50	1½	2	13.188	5.50
2	1	11.063	8.75	2	1	10.563	8.75
2½	1	17.250	15.75	2½	1	16.656	15.75
3	1	27.563	22.00	3	1	25.500	22.00

No. 15 Line Globe and Angle Valves

Special Composition Disc. 125 Lb. W. S. Pressure

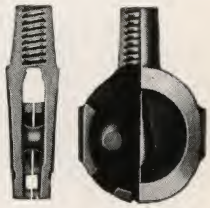
Adaptable to either hot or cold water. They will give the finest service at pressures up to 125 lbs. Discs of composition, proved right for the most exacting service and all valves are supplied with packing when shipped.

GLOBE				ANGLE			
Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each	Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	5.309	$ 1.10	¼	6	5.688	$ 1.10
⅜	6	6.059	1.25	⅜	6	5.996	1.25
½	6	7.371	1.60	½	6	6.383	1.60
¾	4	7.629	2.20	¾	4	6.535	2.20
1	3	7.789	2.80	1	3	7.097	2.80
1¼	2	7.406	4.00	1¼	2	6.730	4.00
1½	1	5.343	5.50	1½	1	4.805	5.50
2	1	8.406	8.75	2	1	8.074	8.75
2½	1	17.250	15.75	2½	1	16.656	15.75
3	1	22.406	22.00	3	1	20.250	22.00

Flexitite Gate Valves

Gate valves are intended for use where a full pressure, unobstructed flow, or a complete shut-off is desired. If full pressure is unnecessary, and a regulated flow is required, a globe or angle type valve is more desirable.

Gate valves which shut off tight on steam, water, air, gasoline, gas, oil, and vacuum systems were one of those so-called impossibilities until the advent of the Flexitite principle. This is a design which does insure absolutely tight gate valves.



Flexitite Disc and Assembly

The Flexitite Disc, as illustrated in detail, is a one-piece casting. It is hollow on the inside with the exception of two posts which join the two faces. A saw slot around the edge introduces a slight flexibility in the disc. This flexibility insures a perfect contact between both sides of the disc and the seats when the valve is closed.

The up and down movement is guided by a milled slot in the sides of the disc, which engages corresponding ribs on the inside of the body. This feature keeps the disc centered and prevents it dragging across and scoring the valve seats.

The one-piece construction insures maximum strength and precision of operation.

The Flexitite Disc is an exclusive Ohio Brass feature.

No. 20 Line Gate Valves

Patented

125 Lb. W. S. Pressure

Non-Rising Stem

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
⅛	6	4.839	$ 1.45
¼	6	4.500	1.45
⅜	6	4.593	1.45
½	6	5.773	1.65
¾	6	8.718	2.05
1	4	8.468	2.80
1¼	2	5.863	3.70
1½	2	8.062	5.00
2	1	6.488	7.30
2½	1	11.375	13.00
3	1	15.625	19.00

No. 21 Line Gate Valves

Patented

125 Lb. W. S. Pressure

Rising Stem

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	4.562	$1.45
⅜	6	4.687	1.45
½	6	5.937	1.65
¾	4	6.000	2.05
1	3	6.781	2.80
1¼	3	10.187	3.70
1½	1	4.500	5.00
2	1	7.437	7.30
2½	1	12.718	13.00
3	1	17.812	19.00

No. 22 Line Gate Valves

Patented

150 Lb. W. S. Pressure

Non-Rising Stem

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	.....	$ 1.45
⅜	6	.....	1.45
½	6	9.666	1.65
¾	6	12.906	2.05
1	4	12.996	2.80
1¼	2	9.624	3.70
1½	2	13.906	5.00
2	1	11.281	7.30
2½	1	.....	13.00
3	1	.....	19.00

No. 25 Line Gate Valves

Patented

100 Lb. W. S. Pressure

Non-Rising Stem

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	4.500	$ 1.45
⅜	6	4.593	1.45
½	6	5.238	1.65
¾	6	7.059	2.05
1	4	7.097	2.80
1¼	2	4.972	3.70
1½	2	6.824	5.00
2	2	7.793	7.30
2½	1	9.718	13.00
3	1	13.718	19.00

Brass Check Valves

No. 1 LINE CHECK VALVES—125 LB. PRESSURE

Rugged, long service giving Valves. Designed to withstand severe requirements without complaint. The Swing Check Valve may be installed either in a horizontal or vertical position.

HORIZONTAL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
⅛	6	1.222	$ .65
¼	6	1.719	.65
⅜	6	2.184	.70
½	6	3.176	.90
¾	6	8.250	1.15
1	6	9.375	1.60
1¼	4	8.922	2.25
1½	2	6.187	3.15
2	2	9.812	4.75
2½	1	9.906	9.00
3	1	14.234	13.00

VERTICAL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	1.625	$ .72
⅜	6	1.875	.77
½	6	2.788	1.00
¾	6	4.500	1.26
1	6	7.152	1.80
1¼	4	6.035	2.52
1½	2	4.538	3.50
2	2	7.933	5.30
2½	1	6.000	10.00
3	1	8.187	14.40

SWING CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	2.863	$ 1.80
⅜	6	2.508	1.80
½	6	3.246	2.00
¾	6	5.488	2.25
1	6	8.844	2.80
1¼	4	8.156	3.65
1½	2	5.144	4.75
2	2	8.750	6.75
2½	1	9.875	15.00
3	1	13.062	24.00

No. 2 LINE CHECK VALVES—100 LB. PRESSURE

The Ohio Brass No. 2 Line of Valves is essentially the same as the No. 1 Line. They are competition valves, but are made without sacrificing the fine points of Ohio Brass Manufacture.

HORIZONTAL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
⅛	6	1.109	$ .65
¼	6	1.547	.65
⅜	6	2.031	.70
½	6	2.988	.90
¾	6	4.726	1.15
1	6	7.574	1.60
1¼	4	7.837	2.25
1½	2	5.391	3.15
2	2	8.843	4.75
2½	1	8.781	9.00
3	1	11.453	13.00

VERTICAL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	1.449	$ .72
⅜	6	1.867	.77
½	6	2.613	1.00
¾	6	4.133	1.26
1	6	6.527	1.80
1¼	4	5.645	2.52
1½	2	3.957	3.50
2	2	7.020	5.30

BALL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	1.547	$ .65
⅜	6	2.031	.70

SWING CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	2.582	$ 1.80
⅜	6	2.387	1.80
½	6	3.113	2.00
¾	6	4.680	2.25
1	6	7.445	2.80
1¼	4	7.207	3.65
1½	2	4.492	4.75
2	2	7.418	6.75

No. 10 LINE CHECK VALVE

Adaptable to either hot or cold water. They will give the finest service at pressures up to 150 lbs. Discs of composition, proved right for the most exacting service.

HORIZONTAL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
¼	6	3.351	$ 1.10
⅜	6	4.339	1.20
½	6	8.563	1.30
¾	6	9.843	1.90
1	6	13.843	2.60

HORIZONTAL CHECK

Size	No. in Pkg.	Wt. Pkg. Lbs.	List Each
1¼	4	13.718	3.60
1½	4	20.000	5.00
2	1	8.718	7.50
2½	1	13.500	13.50
3	1	23.031	21.00

C-1
Compression Stop
Globe Type

"Tioga" Compression Stops

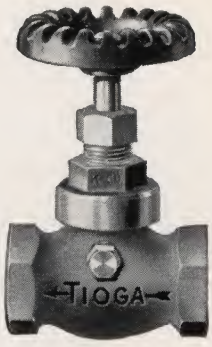
With Stuffing Box

Female Iron Pipe—List Each.

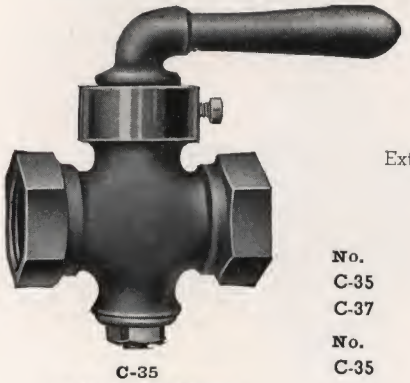
No.	Type	⅜	½	¾	1
C-1	Globe	$ .45	$ .45	$ .52	$1.21
C-1	Angle	.....	.45	.52	.....

STOP & WASTE

No.	Type	⅜	½	¾	1
C-2	Globe	$ .48	$ .48	$ .55	$1.30
C-2	With Union End	.....	.76	.97	.....



C-2
Compression Stop & Waste Globe Type



C-35
Lever Handle Stop

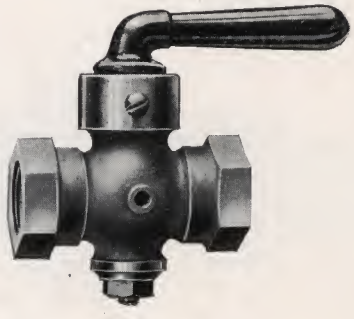
Ground Key Water Stops

Extra Grade No. 2 Patent Cap, Adjustable Handle Flatway Stop.

Female Iron Pipe—List Per Dozen.

No.	⅜	½	⅝	¾
C-35	$20.40	$21.00	$29.40	$36.00
C-37	21.00	21.60	30.00	36.60

No.	1	1¼	1½	2
C-35	$52.80	$89.40	$149.40	$258.00
C-37	54.00	91.20	152.40	264.00



C-37
Lever Handle Stop & Waste

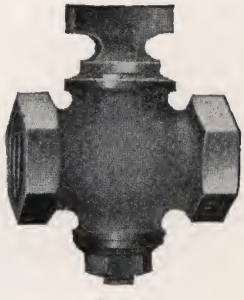
G-201
Flat Head Key

Standard Pattern Flatway Brass Gas Stops

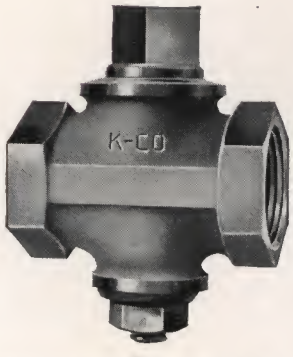
Female—Less Check Pin—List Each

No.	¼	⅜	½	¾
G-201	$1.35	$1.45	$1.55	$1.80
G-203	1.35	1.45	1.55	1.80
G-205	1.35	1.45	1.55	1.80
G-207	1.50	1.60	1.70	1.95
G-215	.....	.....	1.85	2.10

No.	1	1¼	1½	2
G-201	$2.30	$3.25	$5.15	$8.55
G-203	2.30	3.25	5.15	8.55
G-205	2.30	3.25	5.15	8.55
G-207	2.50	3.60	5.60	9.15
G-215	2.70	3.85	5.90	9.55

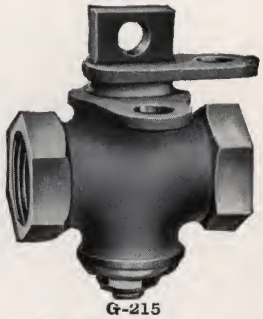


G-203
Tee Head Key



S-1
Steam Cock Square Head Key

G-205
Square Head Key



G-215
Flat Head Key
Lock Wing

Steam Cocks

Standard Flat Head or Square Head

Can also be supplied with Iron Lever Handle

Female Iron Pipe—List Each

No.	½	¾	1	1¼	1½	2
S-1	$1.25	$1.70	$2.35	$3.70	$4.85	$7.30

G-207
Solid Lever Handle Key

Corporation Stops

I. P. S. THREADS

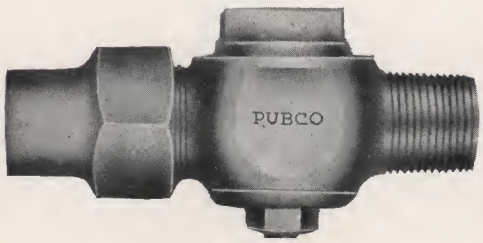
C-2100 FLAT HEAD STRAIGHT WAY
Sizes ½", ¾", 1", 1½", 2"

C-2200 EXTRA HEAVY OVAL WAY CURB
Sizes ½", ¾", 1", 1½", 2"

C-2110 LOCK WING STRAIGHT WAY
Sizes ½", ¾", 1", 1½", 2"

Corporation Stops

FOR COPPER SERVICE PIPE

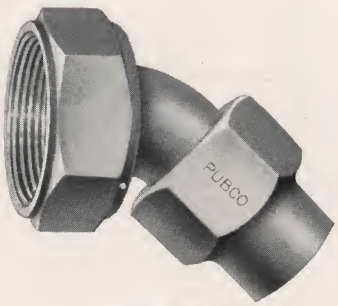


C-2701 INLET Iron Pipe Thread
Outlet Copper Service Pipe same size as Corporation Stops.

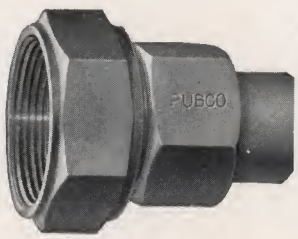
C-2724 FLAT HEAD CURB
with Copper Tube Inlet
Sizes ½", ¾"

Service Pipe Fittings

Adapters for Lead Flange Corporation Stops



C-2738 ADAPTER
For Lead Flange Corporation Cock.



C-2739 STRAIGHT CONNECTION
For Lead Flange Corporation Stop.

C-2740 STRAIGHT CONNECTION
Less Corporation Stop Coupling Nut.

C-2758 EIGHT BEND-COPPER SERVICE PIPE and Inside Thread for Iron Pipe.

The above list does not show all the available types of stops, cocks, and fittings.
Your inquiries for fittings in this line receive prompt and careful attention. Prices quoted upon request.

Silicon Bronze—the new metal that has superior corrosion resistant qualities as well as a very high tensile strength. Ask us about Silicon Bronze. See Index for listing.

Standard Brass Pipe Fittings


Elbow 90°


Elbow 45°


Street Elbow 90°


Street Elbow 45°


Tee


Cross

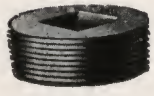

Coupling


Reducing Coupling


Bushing, Regular


Faced Bushing


Plug, Regular


Plug, Countersunk


Locknut


Return Bend

STANDARD BRASS FITTINGS

Working Pressure—125 Pounds Steam; 150 Pounds Water—Flat Bead
All Fittings Air Tested Under Water

List Prices—Each

Rough—For Iron Pipe

Size ..... Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Elbows, 90°	$ .12	$ .15	$ .20	$ .28	$ .40	$ .63	$ .90	$1.20	$2.00	$3.50	$ 6.00	$ 8.00	$10.00	$25.00	$40.00
Elbows, Reducing	.....	.19	.25	.35	.50	.80	1.10	1.50	2.50	4.25	7.50	10.00	12.50	30.00	50.00
Elbows, 45°	.16	.20	.25	.31	.40	.63	.90	1.20	2.00	3.50	6.00	8.00	10.00	25.00	40.00
Elbows, Street, 90°	.25	.27	.33	.48	.63	.85	1.50	2.00	3.25	6.00	10.00	.....	.....	.....	.....
Elbows, Street, 45°	.....	.....	.33	.48	.63	.85	1.50	2.00	3.25	6.00	10.00	.....	.....	.....	.....
Elbows, Drop, Female	.....	.....	.35	.45	.65	1.05	1.50	2.00	3.40	.....	.....	.....	.....	.....	.....
Tees	.17	.21	.28	.40	.55	.85	1.25	1.70	2.80	5.00	8.50	11.00	14.00	35.00	52.00
†Tees, Reducing	.....	.25	.35	.50	.70	1.05	1.55	2.10	3.50	6.25	10.50	14.00	17.50	44.00	65.00
Tees, Drop, Single Ear	.....	.....	.43	.57	.80	1.25	1.85	2.50	4.20	.....	.....	.....	.....	.....	.....
Crosses	.25	.30	.40	.55	.80	1.25	1.80	2.40	4.00	7.00	12.00	16.00	20.00	50.00	80.00
†Crosses, Reducing	.....	.38	.50	.70	1.00	1.55	2.25	3.00	5.00	8.75	15.00	20.00	25.00	63.00	100.00
Couplings	.10	.13	.17	.25	.37	.55	.80	1.00	1.60	2.50	3.50	5.25	7.00	15.00	23.00
Couplings, R. & L.	.13	.17	.22	.30	.45	.70	1.00	1.30	2.00	3.10	4.50	.....	.....	.....	.....
†Bell Reducers	.....	.15	.20	.28	.40	.60	.90	1.10	1.75	2.75	4.00	6.00	8.00	19.00	29.00
†Bushings, Regular	.....	.10	.12	.15	.22	.35	.50	.70	1.00	1.50	2.50	3.75	5.00	12.00	18.00
†Bushings, Faced	.....	.12	.15	.19	.27	.44	.62	.87	1.25	1.85	3.10	4.75	6.25	.....	.....
Plugs, Regular	.08	.10	.12	.15	.20	.30	.45	.60	.95	1.50	2.25	3.75	5.00	8.00	12.00
Plugs, Solid	.....	.....	.18	.22	.30	.45	.80	1.20	1.90	3.00	4.50	7.50	10.00	15.00	23.00
Plugs, Countersunk	.....	.....	.....	.22	.30	.45	.65	.90	1.40	2.25	3.40	.....	7.50	.....	.....
Caps	.10	.13	.16	.20	.30	.42	.60	.80	1.25	2.50	3.50	5.50	7.00	15.00	23.00
Locknuts	.10	.10	.12	.15	.20	.28	.40	.55	.80	1.75	2.75	4.00	5.00	8.00	12.00
Return Bends, Close	.....	.....	.....	.70	1.00	1.25	1.80	2.50	4.25	7.00	10.00	.....	.....	.....	.....
Return Bends, Open	.....	.....	.....	.80	1.10	1.40	2.15	3.00	4.75	8.25	11.00	.....	.....	.....	.....
Wyes	.....	.....	.60	.75	1.10	1.65	2.50	3.30	5.50	9.50	16.00	21.00	26.00	.....	.....

†All Fittings reducing more than two sizes add 25%.

EXTRA HEAVY BRASS FITTINGS

Iron Pipe Size
Working Pressure 250 Pounds—Steam

List Prices—Each

Cast Iron Pattern—Rough, For Iron Pipe

Size ..... Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Elbows, 90°	$ .33	$ .45	$ .65	$1.00	$1.50	$2.25	$3.00	$ 4.50	$ 8.00	$11.25	$16.00	$22.00
†Elbows, Reducing	.....	.55	.75	1.20	1.80	2.60	3.50	5.25	9.00	13.00	19.00	25.00
Elbows, 45°	.45	.55	.75	1.10	1.65	2.50	3.25	4.50	8.00	11.25	16.00	22.00
Elbows, R. & L.	.40	.55	.75	1.20	1.80	2.60	3.50	5.25	9.00	13.00	.....	.....
Tees	.45	.60	.90	1.35	2.00	3.00	4.00	6.00	10.75	15.00	22.00	30.00
†Tees, Reducing	.....	.70	1.05	1.55	2.30	3.50	4.50	6.75	12.00	17.00	25.00	35.00
Crosses	.70	.90	1.30	2.00	3.00	4.50	6.00	9.00	16.00	22.50	28.00	37.00
†Crosses, Reducing	.....	1.10	1.50	2.40	3.60	5.25	7.00	10.50	18.00	26.00	32.00	42.00
Couplings	.40	.50	.70	1.10	1.65	2.25	3.00	4.50	7.00	10.00	13.00	17.00
Return Bends, Close	.....	.....	1.65	2.50	3.50	5.00	7.00	10.00	16.00	22.00	30.00	40.00
Return Bends, Open	.....	.....	1.80	2.75	4.00	5.50	8.00	11.00	18.00	25.00	35.00	45.00
Wyes	.90	1.10	1.50	2.50	3.50	5.50	7.25	11.00	19.00	27.00	33.00	45.00

†All Fittings reducing more than two sizes add 25%.

Brass Unions

Iron Pipe Size—Ground Joint—Octagon and Hexagon

Standard (For 125 Pounds Steam Working Pressure)

Size, inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Rough—Octagon	$.40	$.50	$.65	$.85	$1.15	$1.60	$2.25	$2.70	$4.00	$7.50	$11.50	$20.00	$27.00
Semi-Finished—Hexagon	.45	.55	.75	.95	1.30	1.75	2.50	3.00	4.50	8.25	12.75	22.50	30.00

Extra Heavy Brass Unions—Rough

250 Pounds Steam Working Pressure.

Size, inch	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
List Price, each	$ .85	$1.10	$1.40	$1.60	$1.85	$3.00	$4.00	$5.25	$7.50	.....	.....

Brass Nipples—Iron Pipe Sizes

Size	Length Close	Close	1½	2	2½	Length Nipples (longer than close) Inches 3	3½	4	4½	5	5½	6
⅛	¾	$ .11	$ .13	$ .15	$ .17	$ .19	$ .21	$ .23	$ .25	$ .27	$ .29	$ .31
¼	⅞	.13	.16	.19	.22	.25	.28	.31	.34	.37	.40	.43
⅜	1	.15	.19	.23	.27	.31	.35	.39	.43	.47	.51	.55
½	1⅛	.23	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70
¾	1⅜	.28	....	.35	.42	.49	.56	.63	.70	.77	.84	.91
1	1½	.37	....	.44	.53	.62	.71	.80	.89	.98	1.07	1.16
1¼	1⅝	.60	....	....	.75	.88	1.01	1.14	1.27	1.40	1.53	1.66
1½	1¾	.70	....	....	.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95
2	2	1.00	....	....	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.60
2½	2½	1.70	....	....	....	2.00	2.30	2.60	2.90	3.20	3.50	3.80
3	2½	2.50	....	....	....	2.90	3.30	3.70	4.10	4.50	4.90	5.30
3½	2¾	4.00	....	....	....	....	....	5.40	6.00	6.60	7.20	7.80
4	3	4.75	....	....	....	....	....	6.15	6.85	7.55	8.25	8.95
4½	3	5.50	....	....	....	....	....	7.20	8.05	8.90	9.75	10.60
5	3½	8.50	....	....	....	....	....	....	10.60	11.65	12.70	13.75
6	3½	11.50	....	....	....	....	....	....	14.10	15.40	16.70	18.00

Stainless Steel Nipples—Iron Pipe Sizes

ALLEGHENY METAL

Size	Close	Short	2"	3"	4"	5"	6"	7"	8"	9"	10"
⅛"	$ .70	$ .75	$ .80	$ .90	$1.00	$1.10	$1.20	$ 1.30	$ 1.40	$ 1.50	$ 1.60
¼"	.70	.80	.85	.95	1.10	1.20	1.30	1.45	1.55	1.70	1.80
⅜"	.95	1.05	1.10	1.25	1.35	1.50	1.65	1.80	1.90	2.05	2.20
½"	1.00	1.10	1.15	1.35	1.50	1.70	1.90	2.05	2.25	2.45	2.60
¾"	1.35	1.45	.....	1.65	1.90	2.10	2.30	2.55	2.75	3.00	3.20
1 "	1.45	1.60	.....	1.90	2.20	2.50	2.80	3.10	3.40	3.70	4.00
1¼"	1.85	2.20	.....	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20
1½"	2.15	2.50	.....	2.70	3.15	3.60	4.05	4.50	4.90	5.35	5.80
2 "	2.70	2.95	.....	3.25	3.75	4.30	4.85	5.40	5.90	6.45	7.00
2½"	4.90	5.40	.....	.....	6.35	7.30	8.25	9.25	10.20	11.15	12.10
3 "	5.95	6.35	.....	.....	7.50	8.60	9.70	10.85	11.95	13.00	14.20

Aluminum Pipe Fittings

Showing Stock Sizes.

	⅛	¼	⅜	½	¾	1	1¼	1½	2	3
Elbows 90°	*	*	*	*	*	*	*	*	*	*
Elbows 45°	--	--	--	--	--	--	--	--	--	*
Ells, Side Outlet	--	--	--	--	--	*	--	--	--	--
Ells, Street	--	--	--	--	--	--	--	--	--	*
Tees	*	*	*	*	*	*	*	*	*	*
Couplings	*	*	*	*	*	*	*	*	*	*
Caps	*	*	*	*	*	*	*	*	*	*
Unions	*	*	*	*	*	*	*	*	*	*
Plugs	*	*	*	*	*	*	*	*	*	*
Nipples, Close	*	*	*	*	*	*	*	*	*	*
Lock Nuts	--	*	*	*	*	*	*	*	*	***
Floor Flanges, Drilled	--	--	--	--	--	*	*	--	*	*
Bushings	--	--	--	--	--	--	--	--	--	*
Crosses	--	--	--	--	--	*	--	--	--	--
Gate Valves	--	--	--	--	--	--	--	*	*	--

Cast Brass Flanges

Tank—Floor—Socket

Size	LIGHT Finished Per Each	LIGHT Finished Per Doz.	LIGHT Rough Per Each	LIGHT Rough Per Doz.	HEAVY Finished Per Each	HEAVY Finished Per Doz.	HEAVY Rough Per Each	HEAVY Rough Per Doz.
⅛	$ .36	$ 4.00	$ .30	$ 3.20	$ .56	$ 6.50	$ .50	$ 6.00
¼	.40	4.50	.32	3.60	.60	6.80	.52	6.30
⅜	.44	4.80	.36	3.84	.64	6.90	.60	6.40
½	.50	5.30	.40	4.40	.68	7.00	.64	6.50
¾	.60	6.00	.50	5.50	.76	8.50	.72	7.50
1	.70	7.40	.60	6.00	.90	9.50	.80	8.50
1¼	.80	8.00	.70	7.00	1.10	12.00	1.00	10.00
1½	1.00	10.00	.80	8.00	1.50	16.00	1.30	13.00
2	1.40	15.00	1.20	12.50	2.00	20.00	.....	.....
2½	1.80	18.00	1.50	16.00	3.30	36.00	.....	.....
3	2.80	28.00	2.40	24.00				
3½	3.20	32.00	2.70	30.00				
4	4.00	38.00	3.50	36.00				

Trap Screws

Square Head or With Ears

Size	List Price Per Dozen	List Price Each
½	$ 1.80	$ .15
¾	2.40	.20
1	3.00	.25
1¼	3.60	.30
1½	4.20	.35
2	7.20	.60
2½	12.00	1.00
3	15.00	1.25
3½	18.00	1.50
4	21.00	1.75
5	27.00	2.25
6	42.00	3.50

Stainless Steel Fittings—Iron Pipe Sizes

ALLEGHENY METAL

Price Each

	⅛"	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"
Elbows—90°	$1.05	$1.15	$1.20	$1.35	$1.75	$2.15	$2.85	$ 3.45	$ 5.00	$ 8.80	$11.20	$15.70
Elbows—45°	1.20	1.25	1.35	1.45	1.95	2.35	3.20	3.80	5.55	9.25	11.75	16.55
Elbows, Street—90°	1.40	1.45	1.60	1.75	2.25	2.95	3.80	4.60	6.75	11.75	14.95	20.95
Tees	1.55	1.65	1.75	1.95	2.55	3.20	4.00	5.00	6.95	11.60	16.25	21.05
Laterals & Crosses	2.15	2.25	2.40	2.65	3.45	4.25	5.75	6.95	10.00	17.60	22.40	31.45
Caps	.80	.95	1.00	1.20	1.45	1.75	2.40	3.00	4.00	6.40	8.25	11.75
Plugs	.75	.80	.85	1.00	1.15	1.35	1.75	2.15	2.80	3.85	5.85	9.45
Couplings	1.05	1.15	1.20	1.35	1.75	2.00	2.35	3.05	4.00	6.65	9.20	12.80
Bushings	.....	1.20	1.20	1.20	1.60	1.85	2.65	3.20	4.55	6.95	9.60	13.05
Unions	4.00	4.25	4.40	4.65	5.55	7.20	9.05	10.95	14.15	22.95	31.85	46.40
Lock Nuts	.80	.80	.95	1.05	1.20	1.55	2.00	2.25	2.95	4.05	6.15	8.55
Return Bends—(Close Pattern)	.....	.....	.....	2.65	3.45	4.55	6.80	7.65	11.20	17.60	26.40	36.80

Open Pattern, add 10%.

Reducing Elbows, Tees, Laterals, Crosses, and Couplings, add 15% to price of largest standard size. Stainless Steel Pipe, page 43. Stainless Steel Valves, page 122.

Stainless Steel Flanges—Iron Pipe Sizes

ALLEGHENY METAL

Price Each

Sizes—IPS x Outside Diameter

	½x3	¾x3½	1x4¼	1¼x4½	1½x5	2x6	2½x7	3x7½	4x9	5x10	6x11
Companion Flanges	$3.75	$4.25	$4.40	$5.20	$6.40	$8.00	$10.40	$12.55	$17.60	$20.25	$23.35
Blind Flanges	4.00	4.65	4.80	5.75	6.95	8.65	11.20	13.60	18.80	21.85	25.45
Expanded Type "Lovekin" Flanges	4.60	5.20	5.40	6.40	7.65	9.60	12.05	14.55	20.15	23.60	27.65

Reducing Flanges priced as standard flanges of the largest size.

Extra Heavy Flanges—Prices on application.

	⅛"	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"
Welding Flanges	$1.90	$2.05	$2.25	$2.40	$2.65	$3.20	$3.45	$3.75	$4.65	$5.25	$6.75	$9.40

Stainless Steel Flanged Fittings—Iron Pipe Sizes

ALLEGHENY METAL

Price Each

	1"	1¼"	1½"	2"	2½"	3"	4"	5"	6"	8"	10"
Elbow—90°	$ 9.00	$ 9.60	$12.55	$16.00	$20.15	$25.20	$35.85	$46.80	$ 57.60	$ 86.65	$126.00
Elbow—45°	8.65	9.45	12.15	15.35	19.45	24.25	35.20	45.45	55.45	82.65	118.00
Elbow—90° (Long Radius)	11.20	14.00	15.00	20.00	24.60	31.00	49.60	57.20	76.40	115.20	176.80
Reducer	9.00	9.60	12.55	16.00	20.15	25.20	35.85	46.80	57.60	86.65	126.00
Tee	13.40	14.40	18.80	24.00	30.20	37.80	53.80	70.20	86.40	130.00	188.00
Cross	18.00	19.20	25.05	32.00	40.25	50.40	71.73	93.60	115.20	173.35	252.00
Lateral	15.75	16.80	21.95	23.00	35.35	44.00	62.65	81.80	100.80	151.67	220.40

Reducing Elbows, Tees, Laterals, and Crosses take the same list as standard fitting of largest opening. Extra Heavy Flanged Fittings—Prices on application.

No. 591

No. 593

No. 595

No. 594

No. 597

Brass Railing Fittings

Polished Cast Brass

Threaded to fit IPS Brass Pipe or to slip O. D. Tubing

Price Each

No.	Pipe Size / Tubing Size	¾ / 1	1 / 1¼	1¼ / 1½	1½ / 2	2 / 2½	2½ / 3
590	Elbow	$ .60	$ .80	$1.20	$1.60	$2.50	$3.75
591	Elbow—Side Outlet	1.00	1.10	1.70	2.00	3.00	4.25
592	Tee	.85	1.10	1.70	2.00	3.00	4.25
593	Tee—Side Outlet	1.25	1.50	2.00	2.40	3.50	4.75
594	Cross	1.25	1.50	2.00	2.40	3.50	4.75
595	Round Floor Flange	1.50	2.00	2.50	3.00	3.60	4.50
596	Square Floor Flange	.90	1.00	1.35	1.75	2.50	3.50
597	Ball End Piece	.90	1.00	1.35	1.75	2.50	3.50

Complete Railings can be made to order.

Stainless Steel Railing Fittings

ALLEGHENY METAL

Ball or Plain Pattern

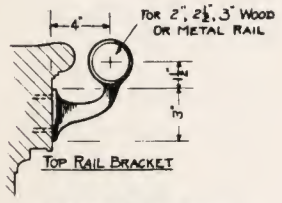
Price Each

For Tubing Sizes—Inches O. D.

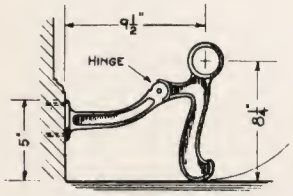
Tubing Size	5⅝"	¾"	⅞"	1"	1¼"	1½"	2"
Elbow	$1.60	$1.84	$2.08	$2.32	$2.56	$3.28	$4.16
Elbow—Side Outlet	1.84	2.08	2.40	2.64	2.88	3.68	4.64
Tee	1.84	2.08	2.40	2.64	2.88	3.68	4.64
Tee—Side Outlet	2.08	2.32	2.72	2.96	3.20	4.08	5.12
Cross	2.08	2.32	2.72	2.96	3.20	4.08	5.12
Cross—Side Outlet	2.32	2.56	3.04	3.28	3.52	4.48	5.60
Round Floor Flange	1.44	1.68	1.84	2.08	2.32	3.04	3.92
Square Floor Flange	1.80	2.08	2.28	2.60	2.88	3.80	4.92

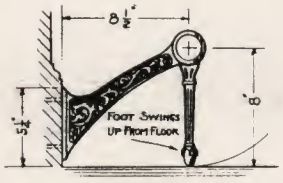
For Architectural Stainless Steel Tubing—See page 43.

Polished Brass Bar Rails Brackets

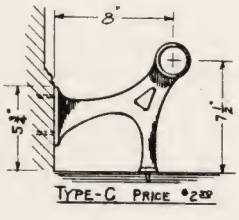


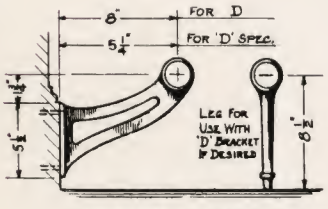
Type H $2.50 Each



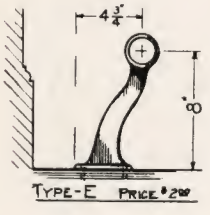


Type B $3.50 Each
Type B—Modified $3.00

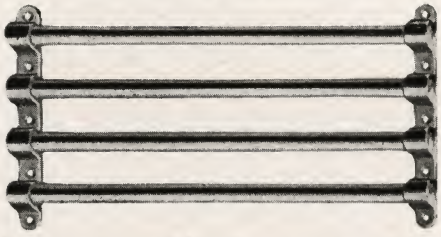




Type D $2.50 Each
Leg D $1.50 Each
Type D Special $2.50 Each



Brass Door Guards



Made of ½" polished brass tubing with polished brass end sockets. Tubes spaced 2½" apart, clearance ¼".

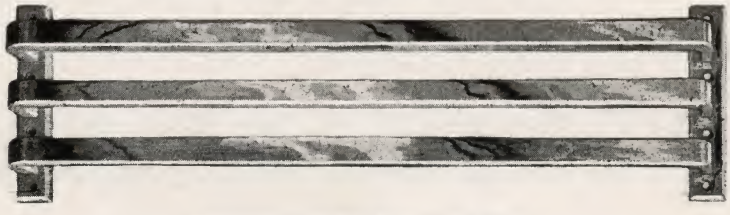
List Price Each

Centers	2 Bar	3 Bar	4 Bar	5 Bar
24"	$3.50	$5.25	$7.00	$ 8.75
30"	3.80	5.70	7.60	9.50
36"	4.10	6.15	8.20	10.25

Furnished complete with screws.
Nickel Plated or Chromium Finish Extra.

Waste & Overflow Short Pattern

Cast Brass and Bronze Push Bars

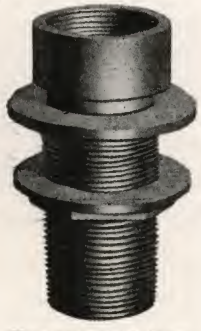


Furnished in polished or dull finish.
Clearance, ¾". Plate size 1¼" wide. Standard length, 30" on centers.
Furnished with wood screws.

Brass or Bronze—List Price Each

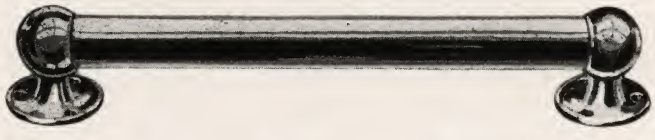
30" Centers	2 Bar	3 Bar	4 Bar
Bar Size ⅜"x1 "	$10.00	$15.00	$20.00
½"x ¾"	10.00	15.00	20.00
½"x1 "	12.00	18.00	24.00

Nickel Plated Brass Finish—Add 10%.
Chromium Plated Brass Finish—Add 20%.



Waste & Overflow Long Pattern

Polished Brass Grab Bars



Made of 1" O. D. polished brass tubing with polished cast brass end sockets, furnished complete with screws.

Standard size 30" centers with ¾" clearance. Other sizes furnished on request.

List Price Each.....**$5.00**

Nickel Plated or Chromium Finish Extra.

WASTE & OVERFLOWS—IPS THREAD

List Price Each

	1"	1¼"	1½"	2"	3"	4"
Long Pattern	$2.50	$2.75	$3.25	$5.25	$9.00	$20.00
Short Pattern	2.25	2.50	2.75	4.00	.....	.....

WASTE WITH STANDING OVERFLOWS

	1"	1¼"	1½"	2"	3"	4"
Open Top	.....	.....	$ 4.00	$6.00	.....	.....
Beehive Top	.....	.....	5.00	7.00	.....	.....

O. D. Tubing Size—Price Each

	1½"	1¾"	2"
Cap End	$ .50	$ .60	$ .75
Acorn End—Short	1.00	1.25	1.50
Acorn End—Standard	1.00	1.25	1.50
Acorn End—Special	.....	.....	2.50

Waste with Standing Overflow (Open Top)

For Kick Plates and Push Plates see Page 50.

Spring Steel Cotters

Price Per 100

Length Inches	Diameter, Inches 1/16	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2	5/8
½	.035	.04	.055	.....	.....	.....	.....	.....	.....	.....
¾	.045	.053	.075	.120	.170	.....	.....	.....	.....	.....
1	.055	.065	.090	.145	.205	.340	.530	.....	.....	.....
1¼	.065	.078	.110	.170	.240	.400	.620	.....	.....	.....
1½	.075	.090	.125	.195	.275	.460	.710	1.05	.....	.....
1¾	.095	.103	.145	.220	.310	.520	.805	.....	.....	.....
2	.105	.115	.160	.245	.345	.580	.900	1.30	2.50	.....
2¼	.....	.....	.....	.270	.380	.640	.990	.....	.....	.....
2½	.....	.155	.200	.295	.415	.700	1.08	1.55	3.00	.....
3	.....	.....	.250	.345	.500	.780	1.17	1.80	3.50	5.75
3½	.....	.....	.....	.....	.575	.860	1.39	2.05	4.00	6.47
4	.....	.....	.....	.....	.650	.940	1.61	2.30	4.50	7.20
5	.....	.....	.....	.....	.....	.....	1.83	2.70	5.50	8.50
6	.....	.....	.....	.....	.....	.....	.....	3.10	6.50	9.80

Spring Brass Cotters

Price Per 100

Length Inches	Diameter, Inches 1/16	3/32	1/8	5/32	3/16	1/4	5/16	3/8	1/2	5/8
½	.28	.32	.44	.....	.....	.....	.....	.....	.....	.....
¾	.36	.424	.60	.96	1.36	.....	.....	.....	.....	.....
1	.44	.52	.72	1.16	1.64	2.72	4.24	.....	.....	.....
1¼	.52	.624	.88	1.36	1.92	3.20	4.96	.....	.....	.....
1½	.60	.72	1.00	1.56	2.20	3.68	5.68	8.40	.....	.....
1¾	.76	.824	1.16	1.76	2.48	4.16	6.44	10.40	.....	.....
2	.84	.92	1.28	1.96	2.76	4.64	7.20	10.40	20.00	.....
2¼	.....	1.24	1.60	2.16	3.04	5.12	7.92	10.40	24.00	.....
2½	.....	1.24	1.60	2.36	3.32	5.60	8.64	12.40	24.00	.....
3	.....	.....	2.00	2.76	4.00	6.24	9.36	14.40	28.00	46.00
3½	.....	.....	.....	.....	4.60	6.80	11.12	16.40	32.00	51.80
4	.....	.....	.....	.....	5.20	7.52	12.88	18.40	36.00	57.60
5	.....	.....	.....	.....	.....	11.28	14.64	21.60	44.00	68.00
6	.....	.....	.....	.....	.....	16.92	21.96	24.80	52.00	78.40

Stainless Steel Cotters

18-8 Chromium-Nickel

ALLEGHENY METAL

Price Per 100

Length Inches	Diameter, Inches 1/16	3/32	1/8	5/32
½	$ .56	$ .64	$ .88	.....
¾	.72	.85	1.20	$1.92
1	.88	1.04	1.44	2.32
1¼	1.04	1.25	1.76	2.72
1½	1.20	1.44	2.00	3.12

Small orders as well as large receive personal attention.

Sash Chain

Both Steel and Bronze

(Actual size of No. 1)

New No.	Old No.	Metal Thickness	No. of Links per Ft.	Tensile Strength	For single sash weighing not over
8	8	.035	20½	250 lbs.	40 lbs.
30	0	.028	20½	325 lbs.	60 lbs.
35	1	.035	20½	475 lbs.	100 lbs.
40	2	.042	21	600 lbs.	150 lbs.
45	2A	.050	19½	700 lbs.	175 lbs.
50	3	.060	19	800 lbs.	200 lbs.
60	4	.062	17	900 lbs.	
65	XXXX	.072	13½	1275 lbs.	

LIST PRICES—PER 1000 FEET

New No.	Old No.	Plain Steel	Cop'd Steel	Sher'd Steel	Cop'd over Sher'd Steel	Hot Galv. Steel	Cop'd over Hot Galv. Steel	Brass	Phosphor Bronze (our Vulcan)	Special high tensile Our Acme
8	8	$ 24.00	$ 26.00	$ 27.00	$32.00	$ 31.00	$36.00	$ 48.00	$ 56.00	$.....
30	0	26.00	28.00	29.00	34.00	34.00	39.00	52.00	58.00	76.00
35	1	29.00	31.00	33.00	38.00	39.00	44.00	62.00	66.00	90.00
40	2	34.00	36.00	39.00	44.00	46.00	51.00	72.50	78.00	110.00
45	2A	43.00	45.00	50.00	55.00	57.00	62.00	99.00	106.00	146.00
50	3	45.00	47.00	52.00	57.00	59.00	64.00	104.00	112.00	156.00
60	4	80.00	83.00	92.00	.....	104.00	.....	166.00	180.00	.....
65	XXXX	100.00	104.00	116.00	.....	130.00	.....	196.00	220.00	290.00

Safety Chain

(Actual size of No. 0)

No.	Metal Thickness	No. Links Per Foot	Approximate Shipping Wt. Per 100 Ft.	List Price Brass Per 100 Ft.	Net Extras For N. P. Brass & Steel Per 100 Ft.	List Price Steel Per 100 Ft.	Net Extras For Hot Galvanizing Per 100 Ft.
000	.015	27	1½ lbs.	$ 3.50	$ .15	$3.00	$ .20
00	.018	27	1¾ lbs.	4.00	.15	3.00	.20
0	.023	24	2¼ lbs.	5.00	.15	3.50	.20
1	.028	20	3 lbs.	6.25	.25	4.00	.35
2	.028	16½	3¼ lbs.	8.00	.35	5.00	.50
3	.035	16½	4 lbs.	10.00	.35	6.00	.50
4	.035	14½	5½ lbs.	11.50	.35	7.75	.50
3 Navy	.035	20½	6 lbs.	10.00	.35	6.00	.50
4 Navy	.042	21	7 lbs.	11.50	.35	7.75	.50

Plumbers' Chain

Plumbers' Chain has been discontinued due to its demand having practically died out. Safety Chain, which is of the same construction, is made in the same number of sizes, and takes the same list prices per 100 feet, as listed above and practically serves any purpose Plumbers' Chain has been used for.

Do you use Seamless or Electric Welded Steel Tubing? If so, get our prices.
Mill inquiries also solicited.

Single Jack Chain

(Actual size No. 12)

Double Jack Chain

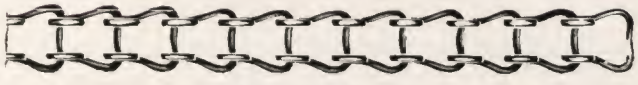
(Actual size No. 14)

No.	Wire Size	Approximate Links Per Ft.	List Prices Per 100 Ft. Iron	Brass
5	.207	8¾	$5.50	$35.00
* 6	.192	9½	4.50	27.75
* 8	.162	11	3.25	18.00
*10	.135	13	2.75	12.00
*12	.1055	16	2.25	8.00
*14	.080	19	1.90	5.50
*16	.0625	25	1.65	3.50
*18	.0475	31	1.50	2.50
*20	.0348	40	1.50	2.00
*22	.0286	52	1.55	2.00
24	.023	63	1.65	2.10

No.	Wire Size	Approximate Links Per Ft.	List Prices Per 100 Ft. Iron	Brass
*10	.135	21	$3.25	$16.75
*12	.1055	26	2.50	11.00
*14	.080	33	2.10	7.00
*16	.0625	38	1.85	4.50
*18	.0475	43	1.65	3.25
*20	.0348	60	1.65	2.50
*22	.0286	70	1.75	2.25
*24	.023	86	1.85	2.50

NET EXTRAS Per 100 Feet for Nickel Plating	Hot Galv.
$1.00	$1.50
.90	1.50
.85	1.40
.70	1.25
.50	1.00
.35	.75
.30	.50
.20	.35
.10	
.10	
.10	

Ladder Chain



(Actual size No. 19)

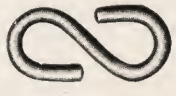
No.	Wire Sizes Ladder & Sprocket	List Prices Per 100 Ft. High Tensile Iron	Brass
12	.1055	$13.50	$20.25	$29.00
14A	.080	8.00	12.00	16.00
14B	.080	7.00	10.50	14.00
15	.072	5.25	7.85	10.50
16	.0625	3.50	5.25	8.00
17	.054	3.00	4.50	5.50
18	.0475	2.75	4.10	4.75
19A	.041	2.50	3.75	4.00
19B	.041	3.50	5.25	6.25
20A	.0348	3.50	5.25	6.25
20B	.0348	4.50	6.75	8.50
22	.0286	4.50	6.75	8.50

Bead Chain

Nickel or Chromium Plated

No. 10 $\frac{3}{16}$" Dia. Beads

BRASS EIGHT HOOKS



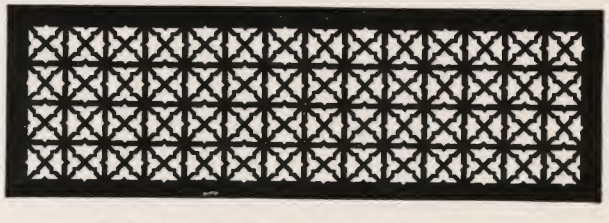
(Actual size No. 5)

Size No.	Per Gross	Net Extra N. P.
1	$2.25	$ .08
2	1.80	.08
3	1.50	.08
4	1.30	.08
5	1.10	.08
6	.90	.08
7	.85	.08

Hendrick Perforated Metal Grilles

A Distinctive Modern Design

HENDRICK Design Patent No. 89,624—50% Open Area



A Pleasing Variation of the Maltese Grille

HENDRICK Design Patent No. 90,096—51% Open Area

Hendrick Perforated Metal Grilles, in a wide variety of patterns, can be supplied in **ALLEGHENY METAL** (18 & 8 Chromium-Nickel, Non-magnetic **Stainless Steel**), bronze, aluminum, Duco finished steel or other commercially rolled metal or alloy.

In addition to a complete range of standard designs, **Hendrick** grilles include many distinctive designs, quite a number of which are patented and exclusive with **Hendrick.** Those illustrated here are but two of the many distinctive designs available.

A special catalog illustrating 72 different types of grilles, and containing complete data on perforations, open areas of various grille designs and other information helpful to those interested in specifying or purchasing grilles will be supplied upon request.

Wire Goods

Cup Hook Without Base

Screw Hook—Round Bend

SCREW HOOKS—ROUND BEND

Length Inch	W. & M. Ga. No.	Brass Wire Item No.	Brass Wire Price Per Gross	Bright Steel Wire Item No.	Bright Steel Wire Price Per Gross
4 15/16	0	.....	$.....	0	$4.75
4 11/16	1	.....	.....	1	4.00
4 7/16	2	.....	.....	2	3.50
4 1/8	3	.....	.....	3	2.75
3 7/8	4	.....	.....	4	2.25
3 5/8	5	.....	.....	5	2.00
3 3/8	6	1006	6.25	6	1.50
2 13/16	7	.....	.....	7	1.25
2 9/16	8	1008	3.50	8	1.10
2 5/16	9	.....	.....	9	1.00
2 1/16	10	1010	2.25	10	.85
1 7/8	11	.....	.....	11	.75
1 11/16	12	1012	1.50	12	.70
1 1/2	13	.....	.....	13	.60
1 5/16	14	1014	1.00	14	.50

SCREW HOOKS—SQUARE BEND

		Brass Wire		Bright Steel Wire	
3 1/16	4	1104	$11.25	104	$2.25
2 7/8	5	.....	.....	105	2.00
2 5/8	6	1106	6.25	106	1.50
2 7/16	7	1107	5.00	107	1.25
2 1/4	8	1108	3.50	108	1.10
2	9	1109	2.75	109	1.00
1 13/16	10	1110	2.25	110	.85
1 9/16	11	1111	2.00	111	.75
1 3/8	12	1112	1.50	112	.70
1 3/16	13	1113	1.25	113	.60
1	14	1114	1.00	114	.50

CUP HOOKS—WITHOUT BASE

		Brass Wire		Bright Steel Wire	
2 3/4	0	.....	$.....	600	$4.75
2 11/16	2	.....	.....	602	3.50
2 1/4	4	1604	11.25	604	2.50
2	6	1606	6.25	606	1.75
1 3/4	8	1608	3.50	608	1.25
1 7/16	10	1610	2.25	610	1.00
1 3/8	12	1612	1.50	612	.75
1 1/8	14	1614	1.00	614	.50

BRASS CUP HOOKS—WITH RETAINING BASE

	Round Bend—Item No. 81				Square Bend—Item No. 412		
Projection Inch	Diam of Base In.	W. & M. Ga. No.	Price Per Gross	Projection Inch	Diam of Base In.	W. & M. Ga. No.	Price Per Gross
3/8	3/8	15	$3.65	1/2	3/8	13	$3.75
1/2	3/8	15	3.75	5/8	7/16	12	3.85
5/8	7/16	14	3.85	3/4	7/16	12	4.00
3/4	7/16	13	4.00	7/8	1/2	11	4.50
7/8	1/2	12	4.50	1	1/2	10	5.25
1	1/2	11	5.25	1 1/8	1/2	10	7.00
1 1/8	5/8	10	7.00	1 1/4	5/8	9	9.00
1 1/4	5/8	9	9.00	1 1/2	5/8	8	11.00
1 1/2	3/4	8	11.00	1 3/4	3/4	7	15.00
1 3/4	7/8	7	15.00	2	3/4	7	18.00
2	7/8	6	18.00				

If our salesman is not handy, just telephone your orders for prompt service.

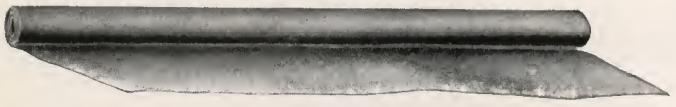
Screw Eyes

BRIGHT STEEL WIRE					BRASS WIRE	
Length Inch	Inside Diam. In.	W. & M. Ga. No.	Steel Item No.	Steel Price Per Gross	Brass Item No.	Brass Price Per Gross
3 7/8	1 1/8	000	000	$9.00	.....	$.....
3 7/16	15/16	00	00	7.00	.....	.....
2 7/8	13/16	0	0	3.60	1000	20.00
2 13/16	25/32	1	1	3.00	1001	15.00
2 5/8	23/32	2	2	2.50	1002	12.50
2 7/16	21/32	3	3	2.00	1003	10.00
2 3/16	39/64	4	4	1.60	1004	7.50
2 1/8	19/32	5	5	1.30	1005	6.50
1 15/16	17/32	6	6	1.00	1006	5.25
1 13/16	31/64	7	7	.85	1007	3.75
1 5/8	15/32	8	8	.75	1008	2.75
1 9/16	7/16	9	9	.65	1009	2.50
1 3/8	13/32	10	10	.55	1010	2.00
1 5/16	25/64	11	11	.50	1011	1.50
1 3/16	3/8	12	12	.45	1012	1.25
1 1/8	23/64	13	13	.40	1013	1.25
1 1/16	11/32	14	14	.40	1014	1.25
2 1/16	31/64	4	104	1.60	1104	7.50
1 15/16	15/32	5	105	1.30	1105	6.50
1 13/16	7/16	6	106	1.00	1106	5.25
1 11/16	13/32	7	107	.85	1107	3.75
1 9/16	25/64	8	108	.75	1108	2.75
1 7/16	11/32	9	109	.65	1109	2.50
1 5/16	5/16	10	110	.55	1110	2.00
1 3/16	19/64	11	111	.50	1111	1.50
1 1/8	9/32	12	112	.45	1112	1.25
1	1/4	13	113	.40	1113	1.25
15/16	1/4	14	114	.40	1114	1.25
7/8	15/64	15	115	.40	1115	1.25
1 15/16	19/64	4	204	1.60	1204	7.50
1 3/4	9/32	5	205	1.30	1205	6.50
1 5/8	17/64	6	206	1.00	1206	5.25
1 1/2	1/4	7	207	.85	1207	3.75
1 3/8	15/64	8	208	.75	1208	2.75
1 1/4	15/64	9	209	.65	1209	2.50
1 3/16	7/32	10	210	.55	1210	2.00
1 1/16	13/64	11	211	.50	1211	1.50
15/16	3/16	12	212	.45	1212	1.25
7/8	11/64	13	213	.40	1213	1.25
13/16	5/32	14	214	.40	1214	1.25
13/16	9/64	14	215	.40	1215	1.25
11/16	9/64	....	216	.40	1216	1.25

Gate Hook & Eyes

ITEM No. 1040—BRASS WIRE			ITEM No. 40—BRIGHT STEEL WIRE		
Length Inch	W. & M. Ga. No.	Item No. Of Eye	Wght. Per Gross	Steel No. 40 Price Gross	Brass No. 1040 Price Gross
1	12	212	.....	$1.50	$6.00
1½	10	211	3½	1.75	6.50
2	9	209	5	2.00	7.50
2½	8	208	7	2.50	10.00
3	7	207	9	3.00	12.50
3½	6	206	10	3.50	15.00
4	6	206	12	4.00	17.50
5	5	205	16	6.00	22.50
6	4	204	21	7.50	27.50
8	4	204	24	9.00	35.00

Sheet Lead



Super-Refined Lead in sheet form. Uniformly durable and highly resistant to corrosion.

OUR SPECIALTY—Is Sheet Lead for Roofers, Builders and plumbing purposes. Corporation and manufacturing requirements, such as—Chemical Works, Oil Refineries, Sulphite Pulp Mills, Storage Battery Tanks, Chlorination Tubs.

WHEN ORDERING SHEET LEAD—State thickness in fraction of an inch or weight per square foot. Dimensions in feet and inches.

KIND WANTED—Regular, Antimonial or Chemical. We prefer to be advised fully as to requirements, especially when differing from ordinary usage. Securing proper thickness is very important.

Weight Lbs. Per Sq. Ft.	Showing Actual Thickness	Fraction	Thickness Inches Decimal	Full Sheet Rolls Width Ft.	Width In.	Length Ft.	Weight Lbs.
1		1/64	.016	4	0	20	80
2½		5/128	.040	8	10	25	552
3		3/64	.047	8	10	25	663
3½		7/128	.055	8	10	25	773
4		1/16	.062	8	10	25	884
5		5/64	.078	8	10	25	1105
6		3/32	.094	8	10	25	1326
7		7/64	.110	9	0	25	1575
8		1/8	.125	9	0	25	1800
10		5/32	.156	9	0	25	2250
12		3/16	.187	9	0	25	2700
14		7/32	.218	9	0	25	3150
16		1/4	.250	9	0	25	3600
20		5/16	.312	9	0	25	4500
24		3/8	.375	9	0	25	5400

Any weight rolled to order. Also any width up to 8 feet 10 inches. Antimonial or hard sheet lead in widths not to exceed 8 feet 6 inches.

Five Fold Caulking Lead

Patented

Pure lead in a convenient practical form. The individual 5-lb. ingots fit the bottom of the melting pot, eliminate the possibility of the pot tipping over, save time and fuel in melting.

Single ingot, weight 5 lbs. Unit of 5 ingots 25 lbs.....

Lead Washers

Used with regular barbed roofing nails to prevent leaking, rusting under nail heads and tearing or cutting of metal by nail head.

SIZE: Hole diameter ⅛ inch, outside diameter ½ in., thickness 1/16 inch. Approximately 260 to the lb. Sufficient for about 2½ squares of roofing. 5 lbs. in package.....

Lead Pipe

Letters are conveniently used in connection with Lead Pipe for designating the thickness of wall.

E—Aqueduct
D—Extra Light
C—Light
B—Medium
A—Strong
AA—Extra Strong
AAA—Ex. Ex. Strong

In tables below we show the wall thickness by fraction of an inch, the letter "S" signifies the measurement is Scant, letter "F" that it is Full.

The Hole Size or Inside Diameter is shown in black face type, for general information we give the outside diameter.

Lead pipe in sizes 1½ inches and smaller is run in Coils of approximate lengths and weights as shown in the table, or when so ordered on Reels that weigh 800 lbs.

NOTE.—When ordering lead pipe, please state the number of feet, the inside diameter, weight per lineal foot or thickness of wall; whether wanted on Reels or in Coils. When wanting less than Coil simply state number of feet.

STANDARD SIZES, PLUMBERS' LEAD PIPE

In Coils

SIZE HOLE, inches	1	1	1¼	1¼	1½	1½
Letter	E	D	E	D	E	D
Weight Feet, lbs.	1½	2	2	2½	3	3½
Outside Diameter, inches	1 3/16	1¼	1 7/16	1 15/16	1¾	1 25/32
Thickness Wall, inches	3/32F	1/8S	3/32	7/64F	1/8S	9/64S
Weight Coil, lbs.	84	122	116	149	170	174
Feet in Coil	55	60	58	60	55	50

HOW PACKED—One or two coils in wooden boxes. Or single coils wrapped with excelsior pads.. Also on reels containing about 800 lbs.

In Lengths

SIZE HOLE, inches	2	2	3	3	4
Letter	D	C	E	D	E
Weight Feet, lbs.	4	5¼	3½	4½	5
Outside Diameter, inches	2¼	2 5/16	3 5/32	3 3/16	4 5/16
Thickness Wall, inches	1/8F	5/32S	5/64	3/32	5/64
Length, Feet	10	10	13	13	13

HOW PACKED—In wooden boxes.

LEAD PIPE can be supplied in coils ⅜" to 1½" and in straight lengths 2" to 8" in practically all wall thicknesses.

LEAD TUBING in coils can be supplied from 1/16" to 5/16" in various wall thicknesses.

Lead Wire and Rod

BURNING LEAD

Diameter Stubs Gauge	Dec. Inch	Approx. Ft. Per Lb.
22	.028	250
20	.035	200
19	.042	125
18	.049	100
17	.058	77
16	.065	62
15	.072	50
14	.083	40
13	.095	25
12	.109	21
11	.120	18

FRACTIONAL SIZES

1/8	.125	15½
5/32	.156	10
3/16	.187	7½
¼	.250	4
5/16	.312	2¾
⅜	.380	1¾
½	.500	1
9/16	.562	8/10

STANDARD PACKING

No. 11 to 22 Gauge on one and five lb. Spools. Fractional Sizes on 100 lb. reels or coils. Fractional Sizes may also be supplied in cut lengths in bundles or boxed.

Tin Tubing or Pipe

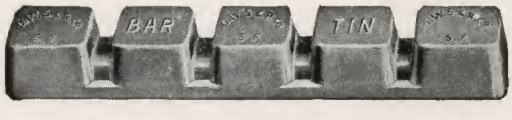
Coils—Random Lengths

Made from pure selected Straits Pig Tin, will be found uniform in bore and thickness to meet requirements of sodawater fountains and equipment, also bottlers of various beverages.

TUBING SIZES

Inside Diameter	Wt. Ft. Ounces	Wall Thick.	No. Ft. Coil	Lbs. Coil	Inside Diameter	Wt. Ft. Ounces	Wall Thick.	No. Ft. Coil	Lbs. Coil
1/8	2	1/16	.....	....	½	9½	3/32	72	43
¼	4	5/64	172	43	⅝	10	3/32	104	65
¼	5	7/64	138	43	¾	12	3/32	110	83
¼	6	7/64	115	43	¾	23	5/32	58	83
5/16	7	7/64	.....	....	1	15	7/64	.....	....
⅜	4	1/16	172	43	1	20	7/64	.....	....
⅜	5	1/16	138	43	1¼	20	3/32	.....	....
⅜	6	3/32	115	43	1½	28	7/64	.....	....
½	6	1/16	115	43	2	44	5/32	.....	....
½	8	3/32	86	43					

Tin



Pure Straits, Banka or Australian Tin in sizes convenient for your use. Bars—5 lbs. each. Strips—1 lb. each. Pigs—75 lbs. and 100 lbs. each.

Used in alloying or in tinning. Melting Point. 449°F. Weight, per cu. in., 0.265 lb.

We carry a large stock of Brass, Steel and Udalite Chain in various styles.

Lead Wool

IN ROPE FORM

PLUMBERS—In every kit there should be a quantity to meet any emergency.

ENGINEERS operating power plants either with Steam, Electricity, Water or Gas, Lead Wool will be found handy. Being handled cold, the melting pot is not required.

ELECTRICIANS—Used with success in cable pipe work.

WHEN AND WHERE TO USE IT

If Lead Wool is good enough in cases of emergency, when the strain on the Calking Material is greatest, then WHY is it not good enough to use on ALL WORK and under ALL circumstances?

APPROXIMATE QUANTITIES REQUIRED FOR CALKING FOR PRESSURE UP TO 500 LBS.

PIPE DIAMETER, inches	2	3	4	5	6	7	8
Wool Depth, inches	1	1⅛	1⅛	1⅛	1⅛	1⅛	1⅛
Wool Weight, lbs.	1½	2½	3	4	5½	7	9
Yarn Depth, inches	2	2	2	2½	2⅝	2⅝	2¾

PIPE DIAMETER, inches	9	10	12	14	15	16
Wool Depth, inches	1⅛	1⅛	1⅛	1¼	1¼	1¼
Wool Weight, lbs.	10	10½	12	13	14	17½
Yarn Depth, inches	2⅝	2⅝	2⅝	3	3	3

PIPE DIAMETER, inches	18	20	24	30	36	42
Wool Depth, inches	1⅜	1⅜	1⅜	1½	1⅝	1⅝
Wool Weight, lbs.	19½	22½	33½	45	60	75
Yarn Depth, inches	3	3⅜	3⅜	3⅜	3⅝	3¾

GENERAL RULES FOR CALKERS

The table above is a good guide as to the amount of Lead Wool required for different pipe sizes. **One Skein of Lead Wool should be calked in first,** using a very narrow faced tool. Yarn should be inserted to the depth given in the table, being careful to calk firmly. Each skein of Lead Wool should be calked separately to obtain best results. Only when calking the larger diameter sizes of pipe do we advise using more than one skein at a time, and then they should be twisted together and calked as one skein with a mechanical hammer.

Best results for calking will be obtained by the use of a hammer weighing 4 lbs. or more and a calking tool that fits closely the space between bell and spigot. A joint should be finished ⅛ inch inside of bell. Never allow Lead Wool to protrude outside of socket. Use a very blunt tool to finish face of joint.

WASTE PIPE JOINTS—Dry Yarn is preferable to be used with Lead Wool, filling the bell to within ¼ inch of the face. Driving in the Lead Wool will compress the yarn. By this method ½ to ¾ inch of lead will be ample, assuring an absolutely tight joint and little lead used.

Antimony

This is the only inexpensive metal which expands on cooling and which causes that same type of expansion in its alloys. It also acts as a hardener in Lead and Tin alloys.

Standard Commercial grade, 99%.

Weight per cu. in., 0.224 lb.

Furnished in cakes weighing 30 lbs.

Special Refined, 99½%.

Melting Point, 1165° F.

Packed in casks weighing 224 lbs. net.

F. G. Copper Ingot

This brand is 99.75% pure or over and suitable for alloying, rolling, drawing, etc.

This grade of Copper is recommended for pure Copper castings or alloys in which high electrical conductivity is required. In ingots weighing 24 or 45 pounds.

Sterling Anti-Friction Metal

Sterling Anti-Friction Metal is a hard lead base metal used for heavy duty, slow running bearings, and is equal to many higher priced Anti-Friction Metals. Sterling should be poured at about 625 degrees Fahr. Each bar weighs approximately 3 pounds and is packed in 50-pound boxes.

ROLLED ZINC BOILER PLATES AND BAR ZINC—See page 32.

A big stock of screws, rivets, nails, fittings, valves, bushings, and other accessories on hand for immediate shipment.

Bearing Metal Chart

	Challenge Nickel Babbitt	XXXX Nickel Babbitt	Genuine Babbitt	Crusher & Gyrator Babbitt	XXXX Diesel Engine Babbitt	Genuine Copper Hardened Babbitt	Acme Copper Hardened Babbitt	Excelsior Babbitt	Hardware Nos. 1, 2, 3 & 4
Uses	For all purposes high grade Babbiting withstands high speeds, pounding, vibration and fluctuating loads.	The highest quality Babbitt produced. It is tough and durable and will give unusually long service.	A "high Tin" Babbitt. Recommended for heavy duty bearings where temperature and vibration are not extreme.	Resists crushing to a remarkable degree under the most severe conditions. Recommended for Gyratory Jaw and Roll Crushers operating under heavy loads. May be used on other types of machines where bearing loads exceed 2,000 lbs. per square inch.	A hard, tough free flowing and extremely durable alloy. It is recommended in some few Diesel engines where unusual bearing loads make essential the use of this special metal.	For all medium duty bearings or on heavy duty work where lubrication and cooling are satisfactory. Economical for use in Cement Mills, etc., where abrasive substances find their way to bearing surfaces.	Is hard and tough. For high-motor speeds and medium pressure heavy duty bearings. Ideal for pumps and small parts of engines.	A high grade extremely hard lead base alloy. For heavy loads at fairly constant speeds. For all purposes where conditions are not so severe as to require a Tin Base Babbitt.	Lead Base Alloys —Uniform and dependable for slow running bearings such as line shafting dolly boxes, ore bin feeders and ore cars.
Pouring Temperature degrees Fahr.	1000-1025°	825-875°	810°	825°	820°	650°	850°	700°	
Compressive Strength Pounds per Square Inch	25°C: 14950	25°C: 14979 — 100°C: 10100	25°C: 14900 — 100°C: 8700	25°C: 16606 — 100°C: 10236	25°C: 15090 — 100°C: 8960	25°C: 11526 — 100°C: 5824			
Brinnell Hardness No. 500K.G. Load 10 M.M. Ball	25.9	24.8 — 14.8	24.5 — 12.0	23.8 — 15.03	22.8 — 14.8	17.8 — 11.5			
Wght.—lbs. per Cu. In.	0.266	0.266	0.267	0.265	0.267	0.307			
Wght.—lbs. per Cu. Ft.	460.	460.	461.	458.	461.	530.			

Babbits

EXCELSIOR BABBITT

A Special Value in a Lead Base Babbitt

This metal is a high grade, extremely hard, lead base alloy. It is tough, pours freely, has minimum shrinkage, and casts a smooth, close fitting bearing that will not score the shaft. It is an all purpose babbitt second to none in performance except the most expensive tin-base alloys. We offer Excelsior Babbitt as a special value, the equal in every respect to the brands being exploited by extravagant claims and sold at prices not in conformity to true worth based on production costs. Service recommendations: For heavy loads at fairly constant speeds. For all purposes where conditions are not so severe as to require a tin-base babbitt. Pouring temperature 700°.

BARS—Size 7⅝x2x1. Weight 4 lbs. Per lb.....

CHALLENGE NICKEL BABBITT

A High Grade, All Purpose, Tin-Base Babbitt, Nickel Hardened.

For all purpose, high grade babitting work under heavy loads. Has extra resistance to wear. Very tough and uniform. Withstands high speeds, pounding, vibration and fluctuating loads. Resists high temperatures. Maintains lubricating film. Recommended to large users for bearings on "Key" machinery; that is machinery which will tie up whole departments should it fail. Recommended to small users for **all** bearings: Where there is relatively small consumption of babbitt, it is actually an economy to use but one grade, and that one the best. Pouring Temperature 1000-1025°.

BARS—Size 7⅝x2x1. Weight 3 lbs. Per lb.....

ACME COPPER HARD

Is Hard and Tough. For high motor speeds and medium pressure heavy duty bearings. Ideal for pumps and small parts of engines. Easy flowing, runs smoothly, and very simple to handle. Pouring temperature 850°F.

Bar Size. 7⅝ x2x1. Weight 3½ lbs. Per lb.....

XXXX NICKEL BABBITT

Carefully Manufactured

XXXX NICKEL BABBITT is the result of over forty years' constant effort to produce the best bearing alloy, regardless of cost. Today it stands supreme in the field of high-grade bearing metals. It is made only of carefully selected virgin materials and each element is subjected to scientific treatment during the process of alloying. Pouring Temperature 825-875°.

LONG WEAR AND SAFETY

XXXX NICKEL BABBITT lasts longer under severe service, because: It holds the oil film. It pours freely and fills all liner crevices. It is anti-frictional. It cannot cut the shaft. It resists high temperatures. It has high thermal conductivity.

HARDWARE GRADES

No. 1 Babbitt:

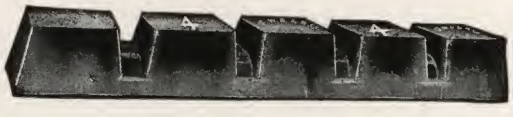
A properly proportioned Lead base alloy, generously toughened with Tin and Copper, extensively used on high speed shafting, conveyors, journals, trippers, screens, and machinery in the light industries.

No. 2 Babbitt:

No. 3 Babbitt:

Slightly lower in Tin than No. 1 Babbitt, but otherwise as high in quality. Where loads are lighter and speed slower they find general favor.

No. 4 Babbitt:



A pure, well alloyed Babbitt for light duty. Because of its high Lead content it requires very little attention and lubrication. Generally used on line shafting and light drives.

Pouring temperature 630°F. Weight, per cu. in., 0.370 lb.

B U N T I N G

Quality

STANDARD STOCK SIZES

CAST BRONZE SLEEVE TYPE BEARINGS

COMPLETELY MACHINED & FINISHED READY FOR ASSEMBLY

TOLERANCES

Outside Diameters
Up to 3" Plus .002, To Plus .003 — Over 3" Plus .003, To Plus .005

Inside Diameters
Up to 3" Plus .001, or Minus .001 — Over 3" Plus .0015, or Minus .0015

Lengths Within
Plus .005, To Minus .005

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
A2	1/4	3/8	1 1/4	.27	.21	.17	.11	.09
BA2	1/4	7/16	1 1/4	.29	.22	.18	.12	.10
A3	5/16	7/16	3/4	.25	.20	.16	.10	.08
A4	5/16	7/16	1 1/4	.27	.21	.17	.11	.09
BA4	3/8	1/2	1 1/4	.27	.21	.17	.11	.09
B6	3/8	9/16	1 1/4	.29	.22	.18	.12	.10
BA9	3/8	5/8	1 1/4	.29	.22	.18	.12	.10
B7	7/16	9/16	1 1/4	.27	.21	.17	.11	.09
B8	"	"	1 9/16	.27	.21	.17	.11	.09
C10	"	"	1 3/4	.29	.22	.18	.12	.10
C9	7/16	5/8	1 1/4	.27	.21	.17	.11	.09
CB10	"	"	2	.31	.24	.19	.13	.11
D66	7/16	3/4	1 1/4	.31	.24	.19	.13	.11
BA13	1/2	5/8	5/8	.25	.20	.16	.10	.08
BB13	"	"	1	.27	.21	.17	.11	.09
B14	"	"	1 1/4	.29	.22	.18	.12	.10
B16	"	"	1 1/2	.31	.24	.19	.13	.11
C16	"	"	1 3/4	.33	.26	.20	.14	.12
C17	"	"	2	.36	.28	.22	.16	.13
C36	1/2	11/16	1 1/4	.31	.24	.19	.13	.11
C37	"	"	1 1/2	.33	.26	.20	.14	.12
C38	"	"	1 3/4	.36	.28	.22	.16	.13
D39	"	"	2	.37	.30	.24	.17	.14
D41	"	"	2 1/2	.39	.32	.26	.18	.15
C68	1/2	3/4	1	.29	.22	.18	.12	.10
C69	"	"	1 1/4	.33	.26	.20	.14	.12
DA70	"	"	1 1/2	.36	.28	.22	.16	.13
D71	"	"	1 3/4	.37	.30	.24	.17	.14
D72	"	"	2	.39	.32	.26	.18	.15
D73	1/2	3/4	2 1/4	.40	.34	.28	.19	.16
D74	"	"	2 1/2	.42	.36	.30	.21	.17
E75	"	"	2 3/4	.43	.37	.32	.22	.18
E112	1/2	13/16	2 1/4	.42	.36	.30	.21	.17
D147	1/2	7/8	1 1/2	.37	.30	.24	.17	.14
E148	"	"	1 3/4	.39	.32	.26	.18	.15
E149	"	"	2	.42	.36	.30	.21	.17
F235	1/2	1	2 1/4	.45	.38	.33	.23	.19
BB45	9/16	11/16	1	.27	.21	.17	.11	.09
BC45	"	"	1 1/4	.29	.22	.18	.12	.10
CD48	"	"	1 1/2	.31	.24	.19	.13	.11
C49	"	"	1 3/4	.33	.26	.20	.14	.12
C50	"	"	2	.35	.28	.22	.16	.13
C80	9/16	3/4	1 1/4	.31	.24	.19	.13	.11
C81	"	"	1 1/2	.33	.26	.20	.14	.12
D82	"	"	1 3/4	.35	.28	.22	.16	.13
D83	"	"	2	.37	.30	.24	.17	.14
D84	"	"	2 1/4	.39	.32	.26	.18	.15
D85	"	"	2 1/2	.40	.34	.28	.19	.16
D113	9/16	13/16	1 1/4	.33	.26	.20	.14	.12
DA114	"	"	1 1/2	.35	.28	.22	.16	.13
D115	"	"	1 3/4	.37	.30	.24	.17	.14
D116	"	"	2	.39	.32	.26	.18	.15
D117	"	"	2 1/4	.40	.34	.28	.19	.16
E118	"	"	2 1/2	.42	.36	.30	.21	.17
D153	9/16	7/8	1 1/2	.37	.30	.24	.17	.14
E154	"	"	2	.40	.34	.28	.19	.16
B90	5/8	3/4	1	.27	.21	.17	.11	.09
B91	"	"	1 1/4	.29	.22	.18	.12	.10
C91	"	"	1 1/2	.31	.24	.19	.13	.11
C93	"	"	1 3/4	.33	.26	.20	.14	.12
C94	"	"	2	.35	.28	.22	.16	.13
C95	5/8	3/4	2 1/4	.37	.30	.24	.17	.14

Write for special catalogue.

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
C98	5/8	3/4	2 1/2	.39	.32	.26	.18	.15
C123	5/8	13/16	1	.29	.22	.18	.11	.10
C124	"	"	1 1/4	.31	.24	.19	.13	.11
C125	"	"	1 1/2	.33	.26	.20	.14	.12
D126	"	"	1 3/4	.35	.28	.22	.16	.13
D127	"	"	2	.37	.30	.24	.17	.14
D128	"	"	2 1/4	.39	.32	.26	.18	.15
C167	5/8	7/8	1	.31	.24	.19	.13	.11
D168	"	"	1 1/4	.33	.26	.20	.14	.12
D169	"	"	1 1/2	.35	.28	.22	.16	.13
D170	"	"	1 3/4	.37	.30	.24	.17	.14
D171	"	"	2	.39	.32	.26	.18	.15
E172	"	"	2 1/4	.40	.34	.28	.19	.16
E173	"	"	2 1/2	.42	.36	.30	.21	.17
E175	"	"	3	.45	.38	.33	.23	.19
D203	5/8	15/16	1 1/2	.37	.30	.24	.17	.14
E206	"	"	2 1/2	.43	.37	.32	.22	.18
E235	5/8	1	1 1/2	.39	.32	.26	.18	.15
E236	"	"	2	.42	.36	.30	.21	.17
E238	"	"	2 1/4	.43	.37	.32	.22	.18
F241	"	"	3	.50	.42	.37	.26	.22
F324	5/8	1 1/8	2 1/4	.53	.45	.40	.31	.25
B119	11/16	13/16	1	.27	.21	.17	.11	.09
C120	"	"	1 1/4	.29	.22	.18	.12	.10
C121	"	"	1 1/2	.31	.24	.19	.13	.11
C137	"	"	1 3/4	.33	.26	.20	.14	.12
C138	"	"	2	.35	.28	.22	.16	.13
D180	11/16	7/8	1 3/4	.35	.28	.22	.16	.13
D182	"	"	2	.37	.30	.24	.17	.14
D183	"	"	2 1/4	.39	.32	.26	.18	.15
D184	"	"	2 1/2	.40	.34	.28	.19	.16
DA212	11/16	15/16	1	.31	.24	.17	.12	.10
D213	"	"	1 1/4	.33	.26	.18	.13	.11
DB214	"	"	1 1/2	.35	.28	.20	.15	.12
D214	"	"	1 3/4	.37	.30	.22	.16	.13
D215	"	"	2	.39	.32	.24	.17	.14
E216	"	"	2 1/4	.40	.34	.26	.18	.15
E217	"	"	2 1/2	.42	.36	.28	.20	.16
D242	11/16	1	1 1/4	.35	.28	.20	.15	.12
E243	"	"	2 1/4	.42	.36	.28	.20	.16
E246	"	"	3	.49	.41	.34	.24	.20
BB187	3/4	7/8	1	.29	.22	.16	.11	.09
CB252	"	"	1 1/4	.31	.24	.17	.12	.10
C179	"	"	1 1/2	.33	.26	.18	.13	.11
CC180	"	"	1 3/4	.35	.28	.20	.15	.12
D181	"	"	2	.37	.30	.22	.16	.13
D010	"	"	2 1/4	.39	.32	.24	.17	.14
DB184	"	"	2 1/2	.40	.34	.26	.18	.15
C222	3/4	15/16	1	.31	.24	.17	.12	.10
C223	"	"	1 1/4	.33	.26	.18	.13	.11
D224	"	"	1 1/2	.35	.28	.20	.15	.12
D225	"	"	1 3/4	.37	.30	.22	.16	.13
D226	"	"	2	.39	.32	.24	.17	.14
D227	"	"	2 1/4	.40	.34	.26	.18	.15
D228	"	"	2 1/2	.42	.36	.28	.20	.16
E229	"	"	2 3/4	.43	.37	.30	.21	.17
E230	"	"	3	.45	.38	.31	.22	.18
C250	3/4	1	3/4	.31	.24	.17	.12	.10
D251	"	"	1	.33	.26	.18	.13	.11
D252	"	"	1 1/4	.35	.28	.20	.15	.12
D253	"	"	1 1/2	.37	.30	.22	.16	.13
D254	"	"	1 3/4	.39	.32	.24	.17	.14
E255	"	"	2	.40	.34	.26	.18	.15
E256	"	"	2 1/4	.42	.36	.28	.20	.16

There is an EXTRA charge for Oil Grooves, Holes, Cutting off and Special Operations. ALL PRICES ARE NET.

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
E257	3/4	1	2 1/2	.43	.37	.30	.21	.17
E259	"	"	3	.49	.41	.34	.24	.20
E260	"	"	3 1/2	.52	.44	.37	.28	.23
E285	3/4	1 1/16	1 1/2	.39	.32	.24	.17	.14
E287	"	"	2	.42	.36	.28	.20	.16
E291	"	"	2 1/2	.45	.38	.31	.22	.18
E322	3/4	1 1/8	1 1/2	.40	.34	.26	.18	.15
E325	"	"	2	.43	.37	.30	.21	.17
E326	"	"	2 1/4	.45	.38	.31	.22	.18
F327	"	"	2 1/2	.49	.41	.34	.24	.20
F329	"	"	3	.52	.44	.37	.28	.23
F011	3/4	1 3/16	2 1/2	.50	.42	.35	.25	.21
FA434	3/4	1 1/4	1 3/4	.47	.40	.33	.24	.18
FC434	"	"	2	.51	.43	.36	.26	.20
F434	"	"	2 1/4	.52	.44	.37	.27	.21
FD434	"	"	2 1/2	.54	.46	.39	.30	.23
G434	"	"	3	.57	.49	.42	.34	.26
C232	13/16	15/16	1	.29	.22	.16	.11	.09
D263	13/16	1	1 1/2	.35	.28	.20	.15	.12
D264	"	"	1 3/4	.37	.30	.22	.16	.13
D266	"	"	2	.39	.32	.24	.17	.14
D267	"	"	2 1/2	.42	.36	.28	.20	.16
DC299	13/16	1 1/16	1 1/2	.37	.30	.22	.16	.13
E301	"	"	2	.40	.34	.26	.18	.15
E303	"	"	2 1/2	.43	.37	.30	.21	.17
E304	"	"	2 3/4	.45	.38	.31	.22	.18
E305	"	"	3	.49	.41	.34	.24	.20
E337	13/16	1 1/8	2	.42	.36	.28	.20	.16
E381	13/16	1 3/16	2	.43	.37	.30	.21	.17
E383	"	"	2 1/2	.49	.41	.34	.24	.20
F385	"	"	3	.52	.44	.37	.28	.23
EA433	13/16	1 1/4	1 1/2	.42	.36	.28	.20	.16
F510	13/16	1 5/16	2	.49	.41	.34	.24	.20
F512	"	"	2 1/2	.52	.44	.37	.28	.23
G514	"	"	3	.55	.47	.40	.32	.26
DB272	7/8	1	1	.31	.24	.17	.12	.10
C274	"	"	1 1/4	.33	.26	.18	.13	.11
DA277	"	"	2	.37	.30	.22	.16	.13
C309	7/8	1 1/16	1	.33	.26	.18	.13	.11
D311	"	"	1 1/2	.37	.30	.22	.16	.13
DA311	"	"	1 3/4	.39	.32	.24	.17	.14
D313	"	"	2	.40	.34	.26	.18	.15
E314	"	"	2 1/4	.42	.36	.28	.20	.16
E315	"	"	2 1/2	.43	.37	.30	.21	.17
C345	7/8	1 1/8	3/4	.31	.24	.17	.12	.10
D346	"	"	1	.35	.28	.20	.15	.12
D347	"	"	1 1/4	.37	.30	.22	.16	.13
D348	"	"	1 1/2	.39	.32	.24	.17	.14
E349	"	"	1 3/4	.40	.34	.26	.18	.15
E350	"	"	2	.42	.36	.28	.20	.16
E351	7/8	1 1/8	2 1/4	.43	.37	.30	.21	.17
E352	"	"	2 1/2	.45	.38	.31	.22	.18
E354	"	"	3	.50	.42	.35	.25	.21
E355	"	"	3 1/4	.52	.44	.37	.28	.23
F356	"	"	3 1/2	.53	.45	.38	.30	.24
D385	7/8	1 3/16	1 1/4	.39	.32	.24	.17	.14
E387	"	"	1 1/2	.40	.34	.26	.18	.15
E392	"	"	2	.43	.37	.30	.21	.17
E394	"	"	2 1/2	.49	.41	.34	.24	.20
F398	"	"	3	.52	.44	.37	.28	.23
E434	7/8	1 1/4	1 3/4	.43	.37	.30	.21	.17
E435	"	"	2	.45	.38	.31	.22	.18
F436	"	"	2 1/4	.49	.41	.34	.24	.20
F438	"	"	2 1/2	.50	.42	.35	.25	.21
F439	"	"	3	.53	.45	.38	.30	.24
F442	"	"	3 1/2	.57	.49	.42	.34	.28
F569	7/8	1 3/8	1 3/4	.47	.40	.33	.24	.18
F570	"	"	2	.51	.43	.36	.26	.20
F575	"	"	2 1/2	.54	.46	.39	.30	.23
G578	"	"	3	.57	.49	.42	.34	.26
D362	15/16	1 1/8	1 1/2	.37	.30	.22	.16	.13
D364	"	"	2	.40	.34	.26	.18	.15
E366	"	"	2 1/2	.43	.37	.30	.21	.17
D403	15/16	1 3/16	1 1/4	.37	.30	.22	.16	.13
E406	"	"	2	.42	.36	.28	.20	.16
E407	"	"	2 1/4	.43	.37	.30	.21	.17
E408	"	"	2 1/2	.45	.38	.31	.22	.18
E412	"	"	3	.50	.42	.35	.25	.21
D446	15/16	1 1/4	1	.37	.30	.22	.16	.13

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
E448	15/16	1 1/4	1 1/2	.40	.34	.26	.18	.15
E450	"	"	2	.43	.37	.30	.21	.17
F452	"	"	2 1/2	.49	.41	.34	.24	.20
F453	"	"	2 3/4	.50	.42	.35	.25	.21
E519	15/16	1 5/16	1 1/2	.42	.36	.28	.20	.16
E520	"	"	1 3/4	.43	.37	.30	.21	.17
F521	"	"	2	.45	.38	.31	.22	.18
F523	"	"	2 1/2	.50	.42	.35	.25	.21
F525	"	"	3	.53	.45	.38	.30	.24
CB415	1	1 3/16	7/8	.33	.26	.18	.13	.11
D417	"	"	1 1/2	.37	.30	.22	.16	.13
D419	"	"	1 3/4	.39	.32	.24	.17	.14
E420	"	"	2	.40	.34	.26	.18	.15
E422	"	"	2 1/2	.43	.37	.30	.21	.17
D460	1	1 1/4	3/4	.33	.26	.18	.13	.11
D461	"	"	1	.35	.28	.20	.15	.12
D462	"	"	1 1/4	.37	.30	.22	.16	.13
E463	"	"	1 1/2	.39	.32	.24	.17	.14
E464	"	"	1 3/4	.40	.34	.26	.18	.15
E465	"	"	2	.42	.36	.28	.20	.16
E466	"	"	2 1/4	.43	.37	.30	.21	.17
E467	"	"	2 1/2	.45	.38	.31	.22	.18
E468	"	"	2 3/4	.49	.41	.34	.24	.20
F469	"	"	3	.50	.42	.35	.25	.21
F471	"	"	3 1/2	.53	.45	.38	.30	.24
F473	"	"	4	.57	.49	.42	.34	.28
E526	1	1 5/16	2 1/4	.45	.38	.31	.22	.18
F527	"	"	2 1/2	.49	.41	.34	.24	.20
F528	"	"	3	.52	.44	.37	.28	.23
F531	"	"	3 1/2	.55	.47	.40	.32	.26
F532	"	"	3 3/4	.57	.49	.42	.34	.28
E597	1	1 3/8	1 1/4	.40	.34	.26	.18	.15
E598	"	"	1 1/2	.42	.36	.28	.20	.16
E599	"	"	1 3/4	.43	.37	.30	.21	.17
F600	"	"	2	.45	.38	.31	.22	.18
F602	"	"	2 1/2	.50	.42	.35	.25	.21
F604	"	"	3	.53	.45	.38	.30	.24
F605	"	"	3 1/4	.55	.47	.40	.32	.26
G606	"	"	3 1/2	.57	.49	.42	.34	.28
G609	"	"	4	.61	.53	.46	.38	.32
G612	"	"	4 1/2	.67	.56	.49	.41	.35
F766	1	1 1/2	2	.50	.42	.35	.25	.21
G770	"	"	2 1/2	.53	.45	.38	.30	.24
G772	"	"	3	.57	.49	.42	.34	.28
H775	"	"	4	.67	.56	.49	.41	.35
G942	1	1 5/8	2 1/2	.57	.49	.42	.34	.28
H944	"	"	3	.61	.53	.46	.38	.32
H946	"	"	3 1/2	.67	.56	.49	.41	.35
I-1181	1	1 3/4	6 1/2	2.40	1.95			
I-1597	1	2	6 1/2	2.80	2.30			
E538	1 1/16	1 5/16	1 1/2	.39	.32	.24	.17	.14
E539	"	"	2	.43	.37	.30	.21	.17
E542	"	"	2 1/2	.50	.42	.35	.25	.21
F544	"	"	3	.53	.45	.38	.30	.24
F546	"	"	3 1/2	.57	.49	.42	.34	.28
E620	1 1/16	1 3/8	2	.49	.41	.34	.24	.20
F698	1 1/16	1 7/16	2 1/2	.53	.45	.38	.30	.24
F700	"	"	3	.57	.49	.42	.34	.28
G702	"	"	3 1/2	.61	.53	.46	.38	.32
G704	"	"	4	.67	.56	.49	.41	.35
G903	1 1/16	1 9/16	2 1/2	.57	.49	.42	.34	.28
G905	"	"	3	.61	.53	.46	.38	.32
H907	"	"	3 1/2	.67	.56	.49	.41	.35
D475	1 1/8	1 1/4	1 1/16	.37	.30	.22	.16	.13
E556	1 1/8	1 5/16	2 1/4	.42	.36	.28	.20	.16
E628	1 1/8	1 3/8	1 1/2	.39	.32	.24	.17	.14
E629	"	"	1 3/4	.40	.34	.26	.18	.15
E630	"	"	2	.42	.36	.28	.20	.16
E631	"	"	2 1/4	.43	.37	.30	.21	.17
E632	"	"	2 1/2	.45	.38	.31	.22	.18
F634	"	"	3	.50	.42	.35	.25	.21
F635	"	"	3 1/4	.52	.44	.37	.28	.23
F636	"	"	3 1/2	.53	.45	.38	.30	.24
F640	"	"	4	.58	.50	.43	.35	.29
E712	1 1/8	1 7/16	1 1/2	.40	.34	.26	.18	.15
F725	"	"	3 1/2	.61	.53	.46	.38	.32
E802	1 1/8	1 1/2	1 1/2	.42	.36	.28	.20	.16
F804	"	"	2	.45	.38	.31	.22	.18
F806	"	"	2 1/2	.50	.42	.35	.25	.21

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Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
G808	1⅛	1½	3	.53	.45	.38	.30	.24
G811	"	"	3½	.57	.49	.42	.34	.28
G812	"	"	4	.61	.53	.46	.38	.32
F982	1⅛	1⅝	1¾	.49	.41	.34	.24	.20
F983	"	"	2	.50	.42	.35	.25	.21
G985	"	"	2½	.53	.45	.38	.30	.24
G986	"	"	3	.59	.51	.44	.36	.30
HA986	"	"	3½	.67	.56	.49	.41	.35
H987	"	"	4	.80	.68	.60	.49	.43
I-1360	1⅛	1⅞	6½	2.50	2.05			
D729	1 3/16	1 7/16	1¼	.37	.30	.22	.16	.13
E730	"	"	1½	.39	.32	.24	.17	.14
E732	"	"	2	.42	.36	.28	.20	.16
E734	"	"	2½	.45	.38	.31	.22	.18
F735	"	"	2¾	.49	.41	.34	.24	.20
F736	"	"	3	.50	.42	.35	.25	.21
F738	"	"	3½	.53	.45	.38	.30	.24
F822	1 3/16	1½	2	.43	.37	.30	.21	.17
F826	"	"	3	.52	.44	.37	.28	.23
E910	1 3/16	1 9/16	1½	.42	.36	.28	.20	.16
F914	"	"	2½	.50	.42	.35	.25	.21
G916	"	"	3	.53	.45	.38	.30	.24
G920	"	"	3½	.58	.50	.43	.35	.29
G1002	1 3/16	1⅝	2½	.52	.44	.37	.28	.23
G1004	"	"	3	.55	.47	.40	.32	.26
G1085	1 3/16	1 11/16	2	.50	.42	.35	.25	.21
G1087	"	"	2½	.53	.45	.38	.30	.24
H1089	"	"	3	.57	.49	.42	.34	.29
H1093	"	"	3½	.63	.54	.47	.39	.33
E754	1¼	1 7/16	3	.49	.41	.34	.24	.20
E838	1¼	1½	1½	.40	.34	.26	.18	.15
E840	"	"	2	.43	.37	.30	.21	.17
E841	"	"	2¼	.45	.38	.31	.22	.18
F842	"	"	2½	.50	.42	.35	.25	.21
F843	"	"	2¾	.52	.44	.37	.28	.23
F844	"	"	3	.53	.45	.38	.30	.24
F846	"	"	3½	.58	.50	.43	.35	.29
F848	"	"	4	.63	.54	.47	.39	.33
G849	"	"	4¼	.69	.57	.50	.42	.36
G851	"	"	5	.85	.73	.65		
GA852	"	"	5½	1.00	.88	.80		
F917	1¼	1 9/16	2 1/16	.49	.41	.34	.24	.20
F918	"	"	2⅝	.53	.45	.38	.30	.24
G937	"	"	3¾	.61	.53	.46	.38	.32
F1016	1¼	1⅝	1¾	.45	.38	.31	.22	.18
F1017	"	"	2	.49	.41	.34	.24	.20
F1019	"	"	2½	.53	.45	.33	.30	.24
G1021	"	"	3	.57	.49	.42	.34	.28
G1023	"	"	3½	.61	.53	.46	.38	.32
H1025	"	"	4	.70	.58	.51	.43	.37
H1027	"	"	4½	.80	.68	.60		
H1028	"	"	4¾	.85	.73	.65		
F1102	1¼	1 11/16	2	.50	.42	.35	.25	.21
F1104	"	"	2½	.54	.46	.39	.31	.25
H1108	"	"	3¼	.61	.53	.46	.38	.32
F1190	1¼	1¾	1¾	.50	.42	.35	.25	.21
G1192	"	"	2¼	.54	.46	.39	.31	.25
H1194	"	"	2¾	.59	.51	.44	.36	.30
H1195	"	"	3	.61	.53	.46	.38	.32
H1197	"	"	3½	.67	.56	.49	.41	.35
H1198	"	"	3¾	.73	.60	.53	.45	.39
H1199	"	"	4	.80	.68	.60	.49	.43
H1203	"	"	5	.95	.83	.75		
H1366	1¼	1⅞	2½	.67	.56	.49	.41	.35
H1368	"	"	3	.73	.60	.53	.45	.39
H1369	"	"	4	.90	.78	.70	.58	.48
I-1602	1¼	2	6½	2.40	2.00			
D755	1 5/16	1 7/16	1¾	.39	.32	.24	.17	.14
FA938	1 5/16	1 9/16	3	.53	.45	.38	.30	.24
FB938	"	"	3½	.57	.49	.42	.34	.28
G939	"	"	4	.67	.56	.49	.41	.35
F1036	1 5/16	1⅝	2½	.51	.43	.36	.26	.22
F1038	"	"	3	.54	.46	.39	.31	.25
G1041	"	"	4	.71	.59	.52	.44	.38
H1045	"	"	4¾	.85	.73	.65		
F1160	1 5/16	1 11/16	2½	.53	.45	.38	.30	.24
G1163	"	"	3	.59	.51	.44	.36	.30
G1164	"	"	3½	.63	.54	.47	.39	.33
H1166	"	"	4	.75	.62	.54	.46	.40
H012	1 5/16	1 11/16	5¼	1.10	.95	.80		
H1286	1 5/16	1 13/16	3	.69	.57	.50	.42	.36
H1288	"	"	3½	.73	.60	.53	.45	.39
H1290	"	"	4	.80	.68	.60	.49	.43
H1428	1 5/16	1⅞	3½	.84	.72	.64	.52	.45
H1432	"	"	4½	1.05	.93	.81		
D853	1⅜	1½	1 13/16	.39	.32	.24	.17	.14
E1051	1⅜	1⅝	2	.47	.40	.33	.24	.20
F1055	"	"	3	.53	.45	.38	.30	.24
F1056	"	"	3¼	.57	.49	.42	.34	.28
F1057	"	"	3½	.59	.51	.44	.36	.30
G1059	"	"	4	.65	.55	.48	.40	.34
G1061	"	"	4½	.75	.62	.54		
G1178	1⅜	1 11/16	3½	.65	.55	.48	.40	.34
F1233	1⅜	1¾	2	.51	.43	.36	.26	.22
F1234	"	"	2¼	.53	.45	.38	.30	.24
G1235	"	"	2½	.54	.46	.39	.31	.25
G1237	"	"	3	.61	.53	.46	.38	.32
H1239	"	"	3½	.67	.56	.49	.41	.35
H1241	"	"	4	.73	.60	.53	.45	.39
H1433	1⅜	1⅞	3	.69	.57	.50	.42	.36
H1434	"	"	3½	.75	.62	.54	.46	.40
H1436	"	"	4	.82	.70	.62	.50	.44
H1438	"	"	4½	.95	.83	.75		
I-1894	1⅜	2⅛	6½	2.50	2.10			
E1067	1 7/16	1⅝	1¾	.43	.37	.30	.21	.17
E1071	"	"	2¾	.53	.45	.38	.30	.24
F1155	1 7/16	1 11/16	2½	.53	.45	.38	.30	.24
F1157	"	"	3	.58	.50	.43	.35	.29
F1159	"	"	3½	.63	.54	.47	.39	.33
G1161	"	"	4	.70	.58	.51	.43	.37
G1162	"	"	4¼	.77	.64	.56	.47	.41
F1255	1 7/16	1¾	2¼	.53	.45	.38	.30	.24
G1262	"	"	4	.73	.60	.53	.45	.39
G1342	1 7/16	1 13/16	3	.60	.52	.45	.37	.31
G1343	"	"	3¼	.65	.55	.48	.40	.34
H1344	"	"	3½	.70	.58	.51	.43	.37
H1346	"	"	4	.79	.66	.58	.48	.42
H1347	"	"	4¼	.84	.72	.64	.52	.45
H1349	"	"	5	1.10	.97	.89		
H1440	1 7/16	1⅞	4¼	.84	.72	.64	.52	.45
G1506	1 7/16	1 13/16	2	.57	.49	.42	.34	.28
H1510	"	"	3	.71	.59	.52	.44	.38
H1512	"	"	3½	.77	.64	.56	.47	.41
H1515	"	"	4¼	.90	.78	.70	.58	.48
H1520	"	"	5½	1.40	1.20	1.08		
E1075	1½	1⅝	1 13/16	.43	.37	.30	.21	.17
E1168	1½	1 11/16	2¾	.57	.49	.42	.34	.28
E1274	1½	1¾	1¾	.43	.37	.30	.21	
F1276	"	"	2¼	.50	.42	.35	.25	
F1277	"	"	2½	.53	.45	.38	.30	
F1279	"	"	3	.58	.50	.43	.35	
F1281	"	"	3½	.63	.54	.47	.39	
G1283	"	"	4	.73	.60	.53	.45	
G1284	"	"	4½	.85	.73	.65		
G1285	"	"	5	1.00	.88	.80		
G1363	1½	1 13/16	3	.60	.52	.45	.37	
G1445	1½	1⅞	2½	.56	.48	.41	.33	
G1447	"	"	3	.60	.52	.45	.37	
H1449	"	"	3½	.70	.58	.51	.43	
H1451	"	"	4	.79	.66	.58	.48	
H1452	"	"	4¼	.84	.72	.64	.52	
H1455	"	"	5	1.10	.97	.89		
H1457	"	"	5½	1.30	1.13	1.08		
H1613	1½	2	2½	.63	.54	.47	.39	
H1615	"	"	3	.75	.62	.54	.46	
H1617	"	"	3½	.82	.70	.62	.50	
H1619	"	"	4	.90	.78	.70	.58	
H1621	"	"	4½	1.10	.97	.89		
H1623	"	"	5	1.30	1.13	1.03		
I-2212	1½	2¼	6½	2.60	2.15			
G1367	1 9/16	1 13/16	3½	.73	.60	.53	.45	
H1524	1 9/16	1 13/16	3½	.75	.62	.54	.46	
H1528	"	"	4½	.96	.84	.76	.64	
F1486	1⅝	1⅞	2¼	.53	.45	.38	.30	
G1492	"	"	3¾	.69	.57	.50	.42	
F1570	1⅝	1 15/16	2¼	.54	.46	.39	.31	
F1652	1⅝	2	1¾	.51	.43	.36	.26	

There is an EXTRA charge for Oil Grooves, Holes, Cutting Off and Special Operations. ALL PRICES ARE NET.

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
G1655	1 5/8	2	2 1/2	.60	.52	.45	.37	
G1657	"	"	3	.69	.57	.50	.42	
H1661	"	"	4	.82	.70	.62	.50	
H1663	"	"	4 1/2	1.00	.88	.80		
H1665	"	"	5	1.20	1.05	.95		
H1667	"	"	5 1/2	1.40	1.20	1.08		
H1904	1 5/8	2 1/8	3	.80	.70	.60	.45	
H1908	"	"	4	1.00	.90	.76	.64	
H1910	"	"	4 1/2	1.15	1.00	.85		
H1912	"	"	5	1.35	1.17	1.06		
G1591	1 1/16	1 5/16	3 1/2	.63	.54	.47	.39	
H1789	1 1/16	2 1/16	3	.69	.57	.50	.42	
H1791	"	"	3 1/2	.80	.68	.60	.49	
H1793	"	"	4	.86	.74	.66	.54	
H1795	"	"	4 1/2	1.00	.88	.80		
H1797	"	"	5	1.25	1.10	.98		
H1799	"	"	5 1/2	1.35	1.17	1.06		
G2084	1 1/16	2 3/16	2	.61	.53	.46	.38	
H2086	"	"	2 1/2	.71	.59	.52	.44	
H2088	"	"	3	.80	.68	.60	.49	
H2090	"	"	3 1/2	.92	.80	.72	.60	
H2092	"	"	4	1.04	.92	.84	.72	
H2094	"	"	4 1/2	1.15	1.00	.89		
H2095	"	"	5	1.35	1.17	1.06		
H2096	"	"	5 1/2	1.55	1.31	1.16		
H2234	1 1/16	2 1/4	4 1/2	1.15	1.01	.93		
F1696	1 3/4	2	2 1/4	.53	.45	.38	.30	
F1697	"	"	2 1/2	.57	.49	.42	.34	
F1699	"	"	3	.63	.54	.47	.39	
H1705	"	"	4 1/2	.90	.78	.70		
H1721	"	"	5 1/4	1.15	1.01	.93		
H1814	1 3/4	2 1/16	3 1/2	.73	.60	.53	.45	
G1949	1 3/4	2 1/8	2 3/4	.69	.57	.50	.42	
H1951	"	"	3 1/4	.80	.68	.60	.49	
H1954	"	"	4	.94	.82	.74	.62	
H1955	"	"	4 1/4	1.00	.88	.80	.68	
H1958	"	"	5	1.20	1.05	.94		
H1960	"	"	5 1/2	1.35	1.15	1.00		
G2248	1 3/4	2 1/4	1 3/4	.65	.55	.48	.40	
H2250	"	"	2 1/2	.77	.64	.56	.47	
H2252	"	"	3	.84	.72	.64	.52	
H2255	"	"	3 1/2	.94	.82	.74	.62	
H2258	"	"	4 1/4	1.10	.97	.89		
H2261	"	"	5	1.30	1.10	.95		
H2630	1 3/4	2 3/8	3 1/2	1.04	.92	.84	.72	
I-2636	"	"	5	1.45	1.23	1.10		
I-3110	1 3/4	2 1/2	6 1/2	3.00	2.50			
H2143	1 13/16	2 3/16	5 1/4	1.30	1.13	1.03		
H2402	1 13/16	2 5/16	4	1.10	.97	.89		
H2404	"	"	5	1.40	1.20	1.08		
F1994	1 7/8	2 1/8	2 1/2	.61	.53	.46	.38	
G1996	"	"	3	.70	.58	.51	.43	
G2000	"	"	4	.90	.78	.70		
H2304	1 7/8	2 1/4	3 1/4	.84	.72	.64	.52	
H2307	"	"	4	1.00	.88	.80		
H2309	"	"	4 1/2	1.10	.97	.89		
H2311	"	"	5	1.30	1.13	1.03		
H2642	1 7/8	2 3/8	3	.90	.78	.70		
H2646	"	"	4	1.10	.97	.89		
H2687	"	"	5 1/4	1.45	1.23	1.10		
F2176	1 15/16	2 3/16	2	.57	.49	.42		
H2184	"	"	4	.90	.78	.70		
G2328	1 15/16	2 1/4	3	.80	.68	.60		
H2334	"	"	4 1/2	1.00	.88	.80		
H2505	1 15/16	2 5/16	3 1/2	.92	.80	.72		
H2507	"	"	4	1.00	.88	.80		
H2511	"	"	5	1.30	1.13	1.03		
H2513	"	"	5 1/2	1.45	1.23	1.10		
H2516	"	"	6 1/4	1.70	1.43	1.25		
H2698	1 15/16	2 3/8	5 1/2	1.55	1.30	1.15		
H2929	1 15/16	2 7/16	3	.90	.78	.70		
H2933	"	"	4	1.10	.97	.89		
H2937	"	"	5	1.40	1.20	1.08		
H2939	"	"	5 1/2	1.55	1.31	1.16		
I-3151	1 15/16	2 1/2	5	1.50	1.27	1.13		
F2349	2	2 1/4	2	.57	.49	.42		
F2351	"	"	2 1/2	.63	.54	.47		
G2353	"	"	3	.71	.59	.52		

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
G2356	2	2 1/4	3 3/4	.80	.68	.60		
H2359	"	"	4 1/2	1.00	.88	.80		
H2361	"	"	5	1.20	1.05	.94		
H2705	2	2 3/8	3	.82	.70	.62		
H2730	"	"	3 1/2	.94	.82	.74		
H2732	"	"	4	1.05	.93	.85		
H2734	"	"	4 1/2	1.20	1.05	.94		
H3168	2	2 1/2	2 1/2	.80	.68	.60		
H3172	"	"	3 1/2	1.04	.92	.84		
H3174	"	"	4	1.15	1.01	.93		
H3176	"	"	4 1/2	1.30	1.13	1.03		
H3178	"	"	5	1.50	1.27	1.13		
I-3180	"	"	5 1/2	1.65	1.39	1.22		
I-3187	"	"	6	1.90	1.59	1.36		
I-4300	2	2 3/4	6 1/2	3.10	2.60			
H3228	2 1/8	2 1/2	3	.84	.72	.64		
H3725	2 1/8	2 5/8	4	1.20	1.05	.94		
H3729	"	"	5	1.55	1.31	1.16		
I-3736	"	"	6	2.00	1.66	1.42		
H3745	2 3/16	2 5/8	4	1.15	1.01	.93		
H4013	2 3/16	2 11/16	3 1/2	1.15	1.01	.93		
H4017	"	"	4 1/2	1.50	1.27	1.13		
I-4310	2 3/16	2 3/4	5 1/4	1.75	1.47	1.28		
I-4320	"	"	6	2.10	1.70	1.45		
I-4381	2 3/16	2 7/8	4 1/2	1.75	1.47	1.28		
H3237	2 1/4	2 1/2	4	1.00	.88	.80		
H3756	2 1/4	2 5/8	4	1.10	.97	.89		
H4029	2 1/4	2 11/16	4 3/4	1.50	1.27	1.13		
H4334	2 1/4	2 3/4	4	1.40	1.20	1.03		
I-4338	"	"	5	1.75	1.50	1.22		
I-4342	"	"	6	2.05	1.70	1.45		
I-4344	"	"	6 1/2	2.20	1.82	1.54		
I-5702	2 1/4	3	5	2.50	2.10			
I-5761	2 1/4	3 1/8	6 1/2	3.75	3.15			
H4361	2 3/8	2 3/4	4	1.25	1.10	.98		
H4363	"	"	5	1.60	1.35	1.19		
H4370	"	"	6	2.05	1.70	1.45		
H5001	2 3/8	2 7/8	4	1.35	1.17	1.06		
I-5005	"	"	5	1.75	1.47	1.28		
I-5009	"	"	6	2.25	1.86	1.57		
H4372	2 7/16	2 3/4	4	1.20	1.05	.94		
H5018	2 7/16	2 7/8	3	1.20	1.05	.94		
H5027	"	"	5	1.70	1.43	1.25		
H5349	2 7/16	2 15/16	4	1.50	1.30	1.15		
I-5353	"	"	5	1.90	1.60	1.40		
I-5358	"	"	6 1/4	2.50	2.05			
H5714	2 7/16	3	3 3/4	1.40	1.20	1.08		
I-5720	"	"	6 1/4	2.70	2.20			
H4382	2 1/2	2 3/4	4	1.20	1.05	.94		
H4386	"	"	5	1.55	1.31	1.16		
H5038	2 1/2	2 7/8	3 1/4	1.25	1.10	.98		
H5726	2 1/2	3	4	1.55	1.20			
I-5730	"	"	5	1.85	1.55			
I-5734	"	"	6	2.35	1.90			
I-5738	"	"	7	3.10	2.60			
H5767	2 1/2	3 1/8	3 1/2	1.70	1.40			
I-5775	"	"	5 1/2	2.80	2.25			
I-5778	"	"	6 3/4	3.25	2.75			
I-6150	2 1/2	3 1/4	4	2.10	1.70			
I-6154	"	"	5	2.45	2.05			
I-6158	"	"	6	3.40	2.85			
J6171	"	"	7 1/4	4.10	3.40			
I-6570	2 1/2	3 1/2	6 1/2	4.60	3.80			
H5745	2 5/8	3	3	1.30	1.13			
H5756	"	"	5	1.80	1.50			
I-5781	2 5/8	3 1/8	5	2.25	1.86			
I-5789	"	"	7 1/4	3.80	3.20			
I-6182	2 5/8	3 1/4	7	4.15	3.45			
I-6288	2 5/8	3 3/8	6 1/2	4.25	3.55			
HA5987	2 11/16	3 3/16	4	1.70	1.43			
I-5991	"	"	5	2.10	1.74			
IA5996	"	"	6 1/4	2.80	2.30			
H5798	2 3/4	3 1/8	4	1.65	1.39			
H6190	2 3/4	3 1/4	4	1.75	1.47			
I-6194	"	"	5	2.15	1.78			

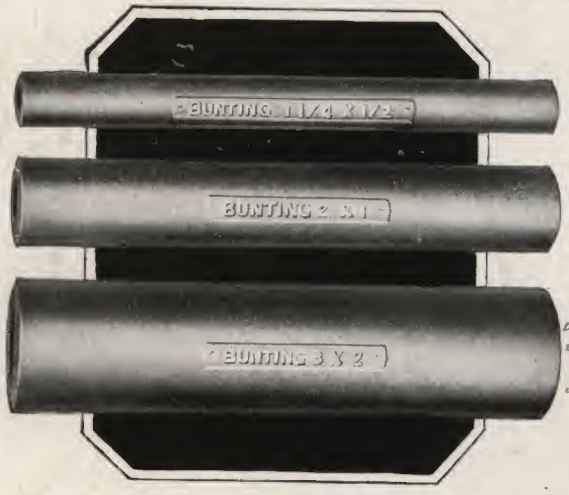
There is an EXTRA charge for Oil Grooves, Holes, Cutting Off and Special Operations. ALL PRICES ARE NET.

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
I-6198	2¾	3¼	6	2.65	2.15			
I-6202	"	"	7	3.90	3.25			
I-6384	2¾	3⅜	4	1.85	1.55			
I-6392	"	"	6½	4.00	3.35			
I-6573	2¾	3½	6½	4.35	4.00			
I-6409	2⅞	3⅜	8	4.20	3.45			
I-6576	2⅞	3½	4½	2.50	2.05			
I-6587	"	"	6¾	4.10	3.40			
H6451	2 15/16	3 7/16	3½	1.80	1.50			
I-6472	"	"	6½	3.20	2.70			
I-6422	3	3⅜	8	4.00	3.35			
I-6598	3	3½	4½	2.40	1.95			
I-6604	"	"	6	3.00	2.50			
IA6612	"	"	9	4.30	3.55			
I-6774	3	3⅝	5	3.10	2.60			
J6786	"	"	8	4.40	3.65			

Part No.	Inside Diam.	Outside Diam.	Lgth.	Price 1-5	Price 6-15	Price 16-30	Price 31-49	Price 50-99
J6941	3	3¾	6¼	3.50	2.95			
J7310	3	4	6½	4.50	3.75			
H6620	3¼	3½	4	1.80	1.50			
I-7006	3¼	3¾	5	2.90	2.40			
I-7010	"	"	6	3.40	2.85			
J7025	"	"	9	4.50	3.70			
I-7414	3½	4	5½	3.20	2.70			
I-7428	"	"	7	3.95	3.30			
I-7590	3½	4⅛	6	3.65	3.05			
J7598	"	"	8	4.70	3.90			
I-7671	3½	4¼	4½	3.40	2.85			
J7682	"	"	9¾	5.00	4.00			
I-7697	3¾	4¼	5	3.30	2.75			
J7711	3¾	4½	6½	4.80	3.90			
I-8191	4	4½	4	3.30	2.75			
I-8203	"	"	7	4.50	3.70			

There is an EXTRA charge for Oil Grooves, Holes, Cutting Off and Special Operations. ALL PRICES ARE NET.
May be furnished from factory with oil grooves, holes or other special operation. Ask for quotation to your specifications.
Telephone or write for our Special Bunting twenty-page catalog. Let us be your supplier of high grade bushings.

Machined and Centered Bronze Bars



Solid 13-Inch Bars

Lengths will not be Cut.

O. D. Inch	Wt. Lbs. Bar	O. D. Inch	Wt. Lbs. Bar	O. D. Inch	Wt. Lbs. Bar
½	1	1⅞	11½	3⅛	31
⅝	1½	2	13¼	3¼	33½
¾	2	2⅛	15	3½	39½
⅞	2¾	2¼	16¾	3¾	45
1	3½	2⅜	19	4	51
1⅛	4½	2½	20¾	4¼	57
1¼	5½	2⅝	22½	4½	63
1⅜	6½	2¾	25	5	78
1½	7¾	2⅞	26¾	5½	96
1⅝	9	3	30	6	118
1¾	10¼	.....	.....	.....	.....

All Bars Machined and Centered

Cored Bronze Bars—13" in Length—Always in Stock

Piece Number	Outside Diam.	Inside Diam.	Approx. Weight
A	1	½	2¾
AX	1	⅝	2¼
B	1¼	½	4¾
BW	1¼	⅝	4¼
BX	1¼	¾	3¾
BY	1⅜	⅝	5¼
BC	1⅜	⅞	3¾
CX	1½	½	6¼
C	1½	¾	5¼
CA	1½	1	4½
CB	1⅝	⅝	7¾
CD	1⅝	⅞	6½
CE	1⅝	1⅛	4¾
D	1¾	¾	8¼
DA	1¾	1	7¼
DX	1¾	1¼	5¼
DC	1⅞	1⅛	7¾
DG	1⅞	1⅜	5¾
DB	2	¾	11¼
E	2	1	10¼
EA	2	1¼	8¼
EB	2	1½	6
EW	2⅛	⅝	13½
EY	2⅛	⅞	12½
EF	2⅛	1⅛	11
EG	2⅛	1⅜	9
EH	2⅛	1⅝	6¼
EX	2¼	1	13¾
F	2¼	1¼	11½
FA	2¼	1½	9½
FC	2⅜	1⅝	10
FG	2⅜	1⅞	7½
GX	2½	1	17¼
GY	2½	1¼	15¾
G	2½	1½	13¼
GA	2½	1¾	10½
GH	2⅝	1⅜	16½
GE	2¾	1	21
GB	2¾	1¼	19¾
GC	2¾	1½	17¼
H	2¾	1¾	15
HA	2¾	2	12¼
HC	2⅞	1⅝	19
HB	2⅞	2⅛	12¾
IX	3	1	25½
IA	3	1¼	24½
IW	3	1½	22
IB	3	1¾	19½
I	3	2	16
IC	3	2¼	13
IE	3¼	1¼	29¼
IF	3¼	1½	26½
IG	3¼	1¾	24
IH	3¼	2	21
J	3¼	2¼	17½
JB	3½	1	35½
JC	3½	1½	31½
JD	3½	1¾	29
JE	3½	2	26¾
JA	3½	2¼	22¾
K	3½	2½	20
KG	3¾	1½	37¼
KE	3¾	1¾	35½
KA	3¾	2	32½
KF	3¾	2¼	29½
KB	3¾	2½	26
KX	3¾	2¾	21½
KC	4	1	48
KH	4	1½	42½
KD	4	2	38½
LA	4	2½	32
L	4	3	24
LB	4¼	1¾	49
LE	4¼	2	44½
LC	4¼	2½	37½
LD	4¼	3	29
M	4¼	3¼	24½
MC	4½	1½	57
MD	4½	2½	46
MI	4½	3	35½
MG	4½	3½	26½
MF	4¾	2¾	48½
MK	4¾	3¼	38
MH	5	2	67
ML	5	2½	59½
MA	5	3	51
ME	5½	2½	75½
MO	5½	3¼	62¼
MB	6	3	86
MX	6	4	63¼

ELECTRIC MOTOR BUSHINGS SUPPLIED. ASK FOR SPECIAL ELECTRIC CATALOGUE.

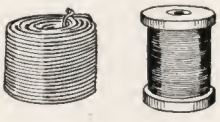
Federated Solders

A Complete Line

Stocked in all standard grades and shapes.

WIRE SOLDER
Solid Wire Std. Gauge ⅛"

Neat-Pak .....5 lb. and 10 lb. Cans
Coils .....1, 5, 10, 25, and 50 lbs.
Spools .....5, 10, 20, 25, and 50 lbs.
Reels .....25 and 50 lbs.



Coil **Spool**

ACID CORE WIRE SOLDER
Standard Gauge ⅛"

Neat-Pak.....1 and 5 lb. Cans
Spools.....20 lbs.
Radio Core—Ribbon Wire.

ROSIN CORE WIRE
Standard Gauge $\frac{3}{32}$"

Neat-Pak.....1 and 5 lb. Cans
Spools.....20 lbs.
Radio Core—Ribbon Wire.

SPECIAL WIRE SOLDER
95-5
Standard Gauge ⅛"

Coils.....1, 5, and 10 lbs.

Designed for use particularly with solder fittings exposed in use to high temperatures.

We can supply wire solder in any of the following gauges:

$\frac{1}{16}$, $\frac{5}{64}$, $\frac{3}{32}$, ⅛, and $\frac{3}{16}$" or B. and S. Gauges as follows: 5, 8, 9, 10, 11, 12, 13, 14, and 15.

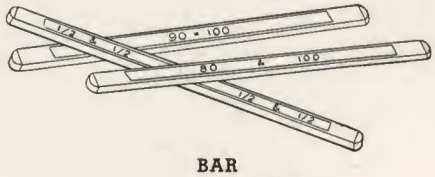
Approximate footage per pound:

Solid Wire.....	⅛"	20 Ft.
Acid Core.....	⅛"	25 Ft.
Rosin Core.....	$\frac{3}{32}$"	46 Ft.

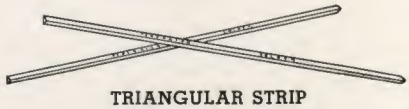
AUTO BODY

5-Lb. Tubes.....

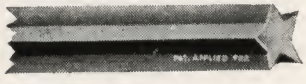
Special grades and shapes supplied to order.



BAR
Standard Bars 1½ Lbs.



TRIANGULAR STRIP
Standard Size ¼" x 22".

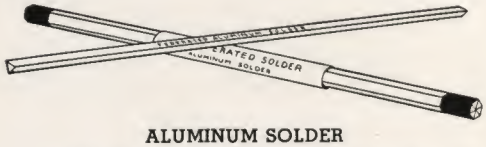


STAR
Standard Size $\frac{5}{16}$" x 21".

This shape is very popular for fast work as the five points provide fast melting, free flowing contacts for the hot copper.

TINKER
A miniature size bar for household or shop use.

DROP
200 to 600 drops to the pound. Convenient when small units are needed.



ALUMINUM SOLDER
Six sticks to the pound—no flux required.

WIPING CAKE
"Cloverleaf" Extra Wiping. Wt. 3 Lbs. To fit the ladle.
Fine Wiping Cake. Wt. 5 Lbs.

ALLEGHENY METAL SOLDER
(For Soldering Stainless Steel)

Special Dairy Solder (Contains no lead)
Dairy Solder does not oxidize or turn dark and should be used for applications:

(a) Where the equipment may be subjected to temperatures up to 300° F.
(b) Where vibration is excessive.
(c) Where the maximum in finish is required.
(d) Where the value of the finished product is such that the extra cost in time and material can be absorbed.

Ask for special booklet on soldering **Allegheny Metal.**

General Purpose **Allegheny Metal** Solder
Should be used for applications:

(a) Where the finished work is not subjected to temperatures higher than 250° F.
(b) Where the job is a production item and speed in soldering is a factor.

Both **Allegheny Metal** Solders supplied in
Bars about 1½ lbs. each.
Wire—⅛", 1, and 5 lb. coils.

Kester Solder—Acid-Core

Kester Acid-Core Solder (for general work) is self-fluxing—it supplies the necessary flux from tiny pockets within itself as it is consumed. Consequently the dealer's sales talk consists of only this familiar phrase: **"It requires only heat."**

Kester permits the novice to do clean and substantial work and the mechanic can double his output with less effort and at a saving of time and material. Auto Repairmen, Plumbers, Tinsmiths, Manufacturers, Farmers, Householders, Radio Fans and many others are daily users of Kester.

The one-pound spool is popular for tool kit and the smaller users, while the larger spools net the purchaser a neat saving.

Diameter ⅛ inch—about 30 feet to the pound. Packed in 1-lb. cartons and on 1, 5, 10 and 20 lb. spools.

Price per pound 1 lb. pkg.....$
5 " " .....
10 " " .....
20 " " .....

Kester Solder—Rosin-Core

Kester Rosin-Core Solder "requires only heat." Like Kester Acid-Core Solder it also possesses the same material and time-saving advantages and is the simplest way for novice or mechanic to make absolutely non-corrosive joints.

It is used extensively in the ever-growing Radio field and for very delicate electrical work including telephone, switchboard joints, etc. Kester Rosin-Core Solder is a little slower in its action on the job and possibly requires more skill than Kester Acid-Core Solder. The largest manufacturers of delicate electrical instruments insist on the use of Rosin-Core Solder and have for years. With this recommendation, Radio fans accept it without question.

Standard size about $\frac{3}{32}$" in diameter and approximately 50 feet to the pound. Put up on one, five, ten and twenty pound spools.

Price per pound 1 lb. pkg.....$
5 " " .....
10 " " .....
20 " " .....

Kester Solder—Paste-Core

Kester Paste-Core Solder is a combination of solder and paste at the price of one. It simplifies soldering and gives positive results.

Kester Paste-Core Solder was placed on the market to allow those who in the past have used ordinary solder and a soldering paste separately, the opportunity of purchasing both items in one. It is made, as all other Kester Solders, of virgin Tin and Lead in a hollow wire form. It is filled with a soldering paste which is most efficient and the result of years of research. The same slogan applies to Kester Paste-Core Solder, namely, "Requires only Heat."

It is put up on 1, 5, 10 and 20 pound spools. Standard about $\frac{3}{32}$" in diameter, runs approximately 30 feet to the pound.

Price per pound 1 lb. pkg.....$
5 " " .....
10 " " .....
20 " " .....

Kester Metal Mender

The extensively advertised package of Acid-Core Solder, designed for household use, automobilist, boy builders and for those who tinker.

Each can of Kester Metal Mender contains a generous coil of solder.

Kester Metal Mender is the smallest package of Kester Acid-Core Solder.

Price per package.....$

Kester Radio Solder—Rosin-Core

To assist in developing better radio soldering, Kester Radio Solder has been put on the market in the most convenient form. Kester is an approved, safe and simple solder. It is a hollow ribbon of genuine tin and lead having inside a pure rosin flux. This flux is in proportion to the surrounding solder and feeds out as the solder is used.

Price per package.....$

Pal-Weld Hard Solder

Strength and Permanence: There has always been a demand for a solder that would develop strength. Pal-Weld has filled this demand. This solder has a bull-dog holding power. Formerly cast iron water jackets and cylinder heads had to be repaired by welding. Now Pal-Weld makes a permanent repair of equal strength at a big saving in time and labor.

Low Melting Point: Pal-Weld Hard Solder melts at 615 degrees F. This is low enough to make repairs without pre-heating. It is still high enough to prevent the solder from melting out of high speed armatures or scored cylinders. Of course its strength is developed by that bond of pure tin which is only secured by Pal-Weld Soldering Compound.

Price, Bar, $2.50. Approximate weight, 1 lb.

Pal-Weld Tinning and Soldering Compound

Cleans and tins at the same time.

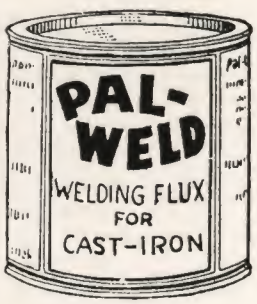
PAL-WELD Soldering Compound combines in a powder form the chemicals for cleaning and the pure tin for tinning. Where in the past it was necessary to use acid for cleaning, and solder for tinning, all that is required now is PAL-WELD. Consider the saving in labor when you are doing considerable soldering. Simply sprinkle on Pal-Weld and rub in thoroughly with a soldering copper. No acid is necessary.

Price: 16-oz., $2.00; 8-oz., $1.00; 4-oz., $.50

Pal-Weld Welding Flux for Cast Iron

Pal-Weld Welding Flux for Cast Iron is the result of extensive laboratory and field tests. Pal-Weld will immediately float all the dirt scale and impurities in the Iron and if used properly will produce a smooth, soft, homogeneous and easily machined repair without hard spots or pores and with strength equal to the original Casting. Particularly recommended for use on low grade Cast Iron.

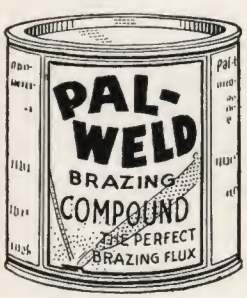
Put up in 1 lb. Cans. Price $ .65



Pal-Weld Soldering Salts

These Soldering Salts are the result of extensive laboratory and field tests. Pal-Weld is a Cleaning and Soldering Flux that gives perfect results when used on dirty or uncleaned surfaces. Particularly recommended for tinners, radiator shops and can manufacturers.

Put up in 1 lb. Cans. Price each $.60



Pal-Weld Brazing Compound

This Brazing Compound is composed of chemicals which, under investigations by laboratory tests and practical work, show unequaled results in brazing of Malleable Iron, Cast-Steel, Cast Iron, Monel, Steel, Copper, Brass, Bronze, etc.

Pal-Weld Brazing Compound produces a smooth, soft, perfect Braze that is easily machined and finished. Requires a lower heat with less expansion and pre-heating and turns out a better class of work.

Put up in 12-oz. Cans. Price $.75

Pal-Weld Aluminum Flux

For drawn or Cast Aluminum, is especially compounded to give satisfactory service under the most trying conditions of grease and dirt.

Put up in ½ lb. Cans Price $.75

Van Dorn electric tools are the best by test. See page 166. Ask for complete catalogue.

Eureka Metal Mender

Uses no Heat—No Flux

Apply as you would a glue or a paste. Mends any combination of Metal to glass, wood, etc. Mends Kitchen Utensils, Leaky pipes, Cylinder Heads, Gasoline Tanks, Jewelry, Leather Goods, Toilet Articles, Aluminum, Furniture, etc. Is water, oil, steam, and gasoline proof.

Put up in Tubes.....25c Each

Alumaweld

The all metal Solder—No special equipment needed. Just heat and apply with soldering iron or torch. Solders Aluminum, Pot Metal, Cast Iron, Brass, Tin, Copper, etc. Has a tensile strength of 10,000 lbs. or 10 times the strength of common solder.

Alumaweld is put up in convenient size packages containing Alumaweld solder, flux, oil tempered steel wire brush and directions.

Price List

Shop Kit	$5.00
Mechanic's Kit	3.50
Service Kit	1.75
Handy Kit	.90

Prices on bulk solder and flux quoted on request.

Nokorode Paste

Nokorode Soldering Paste will flux all metals except aluminum and is used in place of acid for all soldering jobs. Absolutely non-corrosive, safe as rosin and rapid as acid. Not affected by heat and does not spatter. Solder does not turn dark after using. Has a high tensile strength.

2 Oz. Can.....Per can $0.15
Per Carton 3.60

Can Size Lbs.	1	10	25	50
Per Lb.	$ .90	$ .50	$ .45	$ .43
1 lb. Cans, per Carton of 6				4.50
In Bbls., 500 lbs. Per lb.				.40

Nokorode Soldering Salts

Nokorode Soldering Salts eliminates the use of corrosive acid and is the remedy for all soldering trouble. Makes perfect, lasting and non-corrosive joints. Used by plumbers, tinsmiths and manufacturers. Highly economical with no disagreeable fumes.

Can Size Lbs.	1	5	25	50
Per Lb.	$ .60	$ .45	$ .35	$ .32
In Bbls., 500 lbs. Per lb.				.20

Perfec-Shine Metal Polish

Unexcelled for Silver, Nickel, Brass, Chromium, Copper, Aluminum, Tile and Enamel; Gold Plated Instruments, Jewelry, etc.; Glass, Glassware and Mirrors. Non-Inflammable and Harmless to Hands and Metal.

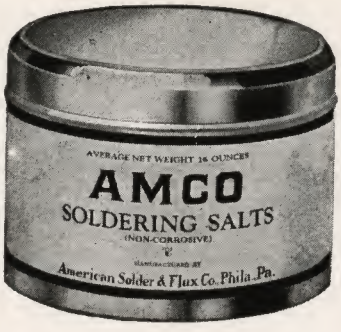
7 Oz. Can.....$ .25 16 Oz. Can.....$ .50

ALLEGHENY METAL Polishing Powder

This powder easily removes heat tints without scratching the material. On polished material it will remove finger prints and dirt and restore the brightness of the original finish.

Supplied in 1 Lb. and 5 Lb. Cans.

Largest stock of sheet copper in the west. All sizes and weights in Soft, Cold Rolled, Tinned or Polished Copper.



An excellent soldering flux in the form of Salts, to which water is added in various proportions, making a flux superior to cut acid, that is harmless, free from acid and objectionable fumes.

Packed in

1-lb. Can	$.60	50-lb. Container, per lb.	$.32
5-lb. Can, per lb.	.45	Drums	

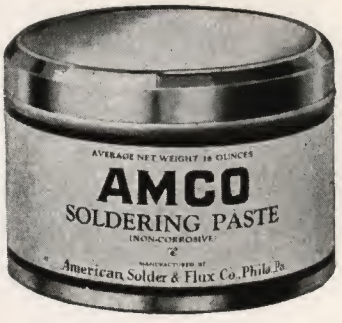
Packed in attractive cartons of ¼, ½ and 1 lb. each. Orders may be for assorted sizes.

The modern Sal-ammoniac, replacing the wasteful and uneconomical lump. SALBRICK, however, is not merely pressed Sal-ammoniac, the physical structure being entirely changed, making the brick much harder and more lasting than any other form.

"Tinol"

Tinning Stick and Powder is designed to meet the need of a flux to permit the soldering of all metals with little or no preparation, such as previous filing, cleaning, scraping, etc. The flux, being very much more active than acids, penetrates most foreign surfaces and will fuse readily with the metal to be soldered.

Will coat all metals such as Brass, Copper, Sheet or Cast Iron, also Stainless Steel, Monel Metal, Aluminum as well as other metals and their alloys. Will penetrate grease, rust, or paint.



AMCO Soldering Paste contains a small percentage of powdered solder, enabling the flux to tin the surface.

Sold in 2 oz., 1 lb. and 50 lb. Containers
Sample Upon Request

2-oz. Can	$.15
1-lb. Can	.90
50-lb. Can, per lb.	.43

Silver Solder

Round Wire—1 Oz. Coils

B&S Gauge

Diam. Ga. No.	Decimal Inch
*3/32"	.09375
12	.080
14	.064
16	.050
18	.040
20	.032
22	.025

*About 1 foot long.

Ribbon—1 Oz. Cans

Thick. Inch	Width Inch
.003	½
.003	¾
.004	¾
.004	1
.005	⅞

Square Sticks—¼ Oz. Each

Size	Length
1/16"—.0625	10" to 12"

SHEET SILVER SOLDER

1 Oz. Per Sheet.

Alsol Soldering Flux

(For Stainless Steel)

The best material for soldering Allegheny Metal. It works quickly, is economical and prepares the surface to be soldered enabling the solder to take hold well and produce a strong joint.

Pint	Half-Gal.	Gallon
$1.20	$4.25	$7.25

National Brazing Flux

National Brazing Flux has proven its worth on some of the most difficult jobs ever undertaken.

For the fusion welding of brass or bronze and for the brazing of steel, malleable iron and cast iron it is unsurpassed.

No. 1-F. Brazing Flux, 1 lb. cans.....Each $1.00

National Cast Iron Flux

A high grade flux, made from the best materials obtainable. It is very uniform and produces a clean machineable weld.

No. 2-F. Cast Iron Flux, 1 lb. cans.....Each $ .50

National Cast Aluminum Flux

National Cast Aluminum Flux is without doubt one of the best compounds for welding cast aluminum. It cleans and breaks up the oxide until the metal flows freely.

No. 3-F. Cast Aluminum Flux, ½ lb. cans, ea. $1.50

Welding Nozzle Chart

For No. 110 National Welding Torch

Size of Nozzle P Type	Drill Size Orifice	Thickness Metal in Inches	Working Pressure Acety.	Working Pressure Oxygen	Approximate Consumption of gas per hr. in cu. ft. Acetylene	Approximate Consumption of gas per hr. in cu. ft. Oxygen
P- 0	76	1/32	1	1	2.0	2.0
P- 1	72	1/32 to 3/32	1	1	3.0	3.0
P- 2	66	1/16 to 1/8	2	2	5.0	5.0
P- 3	55	1/8 to 1/16	3	3	9.0	9.0
P- 4	51	5/32 to 9/32	4	4	14.0	14.0
P- 5	46	1/4 to 7/16	5	5	22.0	22.0
P- 6	41	3/8 to 5/8	6	6	30.0	30.0
P- 7	39	7/16 to 3/4	7	7	38.0	38.0
P- 8	36	3/4 to 1 1/8	8	8	54.0	54.0
P- 9	32	1 to 1 1/2	9	9	70.0	70.0
P-10	30	1 to 2	10	10	100.0	100.0

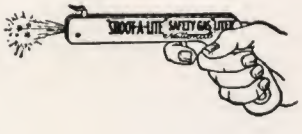
Cutting Tip Chart

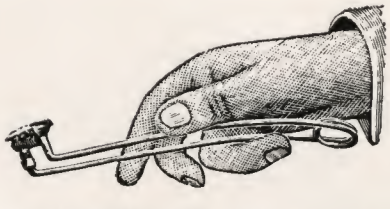
For No. 200 National Attachment and No. 400 National Cutting Torch

Size of Tip	Drill Sizes Preheat Orifice	Drill Sizes High Pressure Cutting Orifice	Oxygen Line Pressure	Acetylene Line Pressure	Thickness of Steel
AA0	76	60	10 to 20	3	1/16" to 1/2"
AA1	72	57	15 to 30	3	1/8" to 3/4"
AA2	70	54	15 to 50	5	1/4" to 2"
AA3	68	51	20 to 60	5	1/2" to 4"
AA4	66	46	30 to 60	5	2" to 6"
AA5	64	42	60 to 80	8	6" to 8"
AA6	61	37	70 to 100	8	8" to 10"
AA7	58	32	100 and up	10	12"
AA8	56	30	150 and up	10	14"

Note.—This schedule is accurate only when NATIONAL Regulators are used. We do not recommend tips larger than AA5 for the No. 200 cutting attachment.

Torch Lighters





Use a LIGHTER. It's the Safe and Economical way to light torches. The two types of lighters shown here are the popular selection of most welders.

No. 1130. Shoot-a-lite with one flint.....Each $ .50

No. 1130F. Shoot-a-lite flints.....Each $.10 Per Doz. 1.20

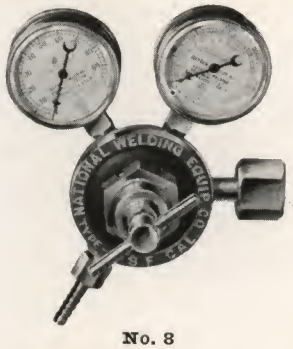
No. 1131. Round file lighter with slip-on flint.....Each .30

No. 1131F. Slip-on flints.....Each $.10 Per Doz. 1.20

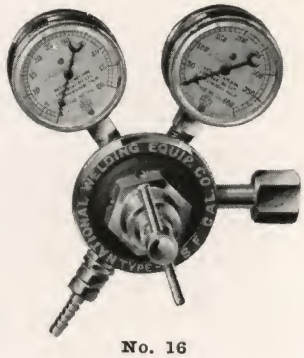
No. 1132. Round file lighter with screw-on flint.....Each .25

No. 1132F. Screw-on flints.....Each $.10 Per Doz. 1.20

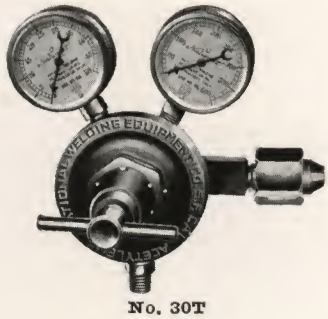
	Price Each
No. 8-OD Oxygen Regulator	$14.00
No. 16-AD Acetylene Regulator with adapter	14.00
No. 30-T Oxygen Regulator	22.75
No. 40-T Acetylene Regulator with adapter	22.75
No. 128-O Oxygen Regulator	12.50
No. 113-O Acetylene Regulator	12.50
No. 50 Welding Torch with five nozzles	15.00
Extra nozzles—Type G, Sizes 0, 1, 2, 3, 4, 5	1.75
No. 25 Cutting Attachment with one tip	15.00
Extra cutting tips—Type 25, Sizes 1, 2, 3, 4	2.50
No. 110 Welding Torch with five nozzles	29.75
Extra nozzles—Type P, Sizes 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	3.00
No. 200 Cutting attachment with AA-2 tip	20.00
Extra tips—Type 200, Sizes 0, 1, 2, 3, 4, 5	3.50
No. 33 Lead burning torch with three tips	6.50
No. 3 Blow pipe with two tips for air and gas and one tip for oxygen and gas	6.50
No. 2 Blowpipe same as No. 3 except no air control valve	5.00
Extra tips for above—air and oxygen Nos. OX 1, 2, 3, 4 or 5	.50
Extra tips for above—air and gas No. N-0 or N-1	1.00
No. N-2	1.25
Orthodontic Blowpipe (Gas and air)	6.00
No. 4 Natural gas industrial bluow torch	15.00
No. 6 Natural gas industrial blow torch	16.00
No. 464 Fibre Goggle (specify light, medium or dark lens)	2.00
No. 444 50-MM. Goggle (specify shade)	2.50
No. 47-MM. Colored Lenses (specify shade)	.50
No. 47 Clear Lenses	.10
No. 50-MM. Colored Lenses (light, medium or dark)	.60
No. 50 Clear Lenses	.15



No. 8



No. 16



No. 30T

No. 40T

National Outfit No. 35-C

For Oxygen and Acetylene.

For light and medium welding and cutting. Price complete.....$63.25

This outfit consists of: 1 No. 50 torch complete with five nozzles; 1 No. 25 cutting attachment with one tip; 1 No. 8 OD double gauge safety oxygen regulator; 1 No. 16 AD double gauge safety acetylene regulator; 2 12½ ft. lengths $\frac{3}{16}$" standard hose; 1 pair welding and cutting spectacles; 1 lighter; and 1 wrench.

National Welding Outfit No. 35

Same as No. 35-C listed above, less cutting attachment. Price complete.....$48.25

National Outfit No. 44

For Oxygen and Acetylene.

For lead burning and light welding. Price complete.....$36.50

This outfit consists of: 1 No. 33 lead burning torch with three tips; 1 No. 128-O single gauge oxygen regulator; 1 No. 113-O single gauge acetylene regulator; 2 12½ ft. lengths $\frac{3}{16}$" standard hose; and 1 No. 464 welding goggles.

National Welding Outfit No. 46

For Oxygen and Light Gas or for Air and Light Gas, such as natural gas, city gas, propane, and butane gasses, such as Flamo, Shellane, etc.

Combination lead burning, radiator, and brazing outfit.

Price complete.....$22.00

This outfit consists of: 1 No. 3 blowpipe with two tips for air and gas, and one tip for oxygen and gas; 1 No. 128-O oxygen regulator; and 2 12½ ft. lengths $\frac{3}{16}$" standard hose.

Ask for separate catalogue showing complete NATIONAL line.

National Outfit No. 70

For Oxygen and Acetylene.

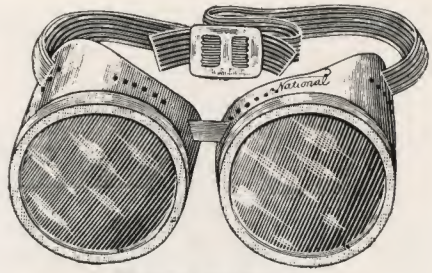
For general purpose welding and cutting with a wide range capacity.

Price complete.....$105.00

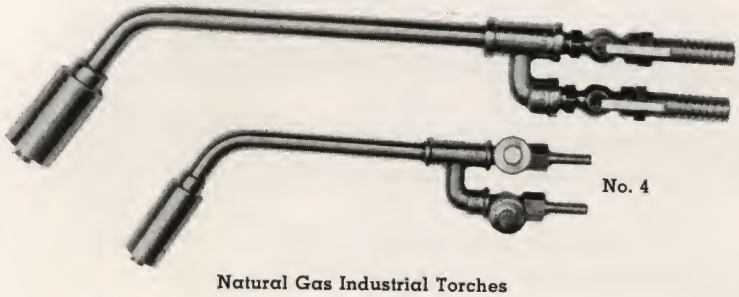
This outfit consists of: 1 No. 110 welding torch with five nozzles; 1 No. 200 cutting attachment with AA2 tip; 1 No. 30T oxygen regulator, 1 No. 40T acetylene regulator; 1 No. 464 goggles; 1 lighter; and 2 25 ft. lengths of hose.

No. 113-O

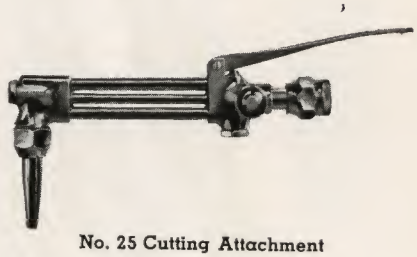
No. 128-O



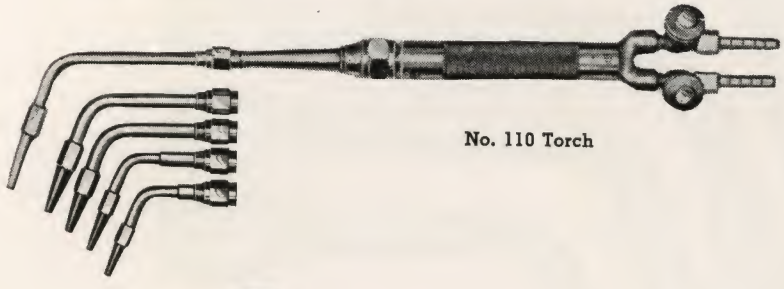
National Welding Goggles



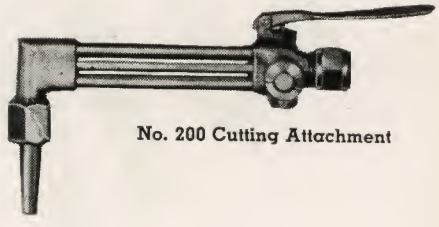
Natural Gas Industrial Torches



No. 25 Cutting Attachment



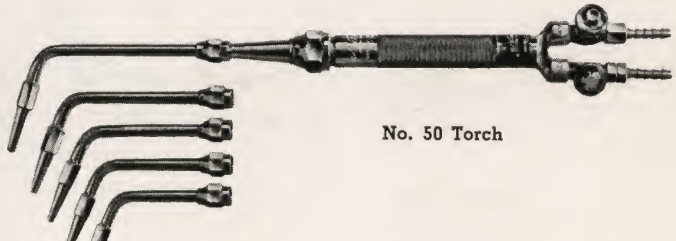
No. 110 Torch



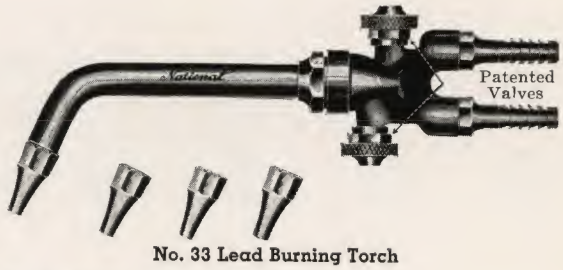
No. 200 Cutting Attachment

Full Size

National Orthodontic Blowpipe



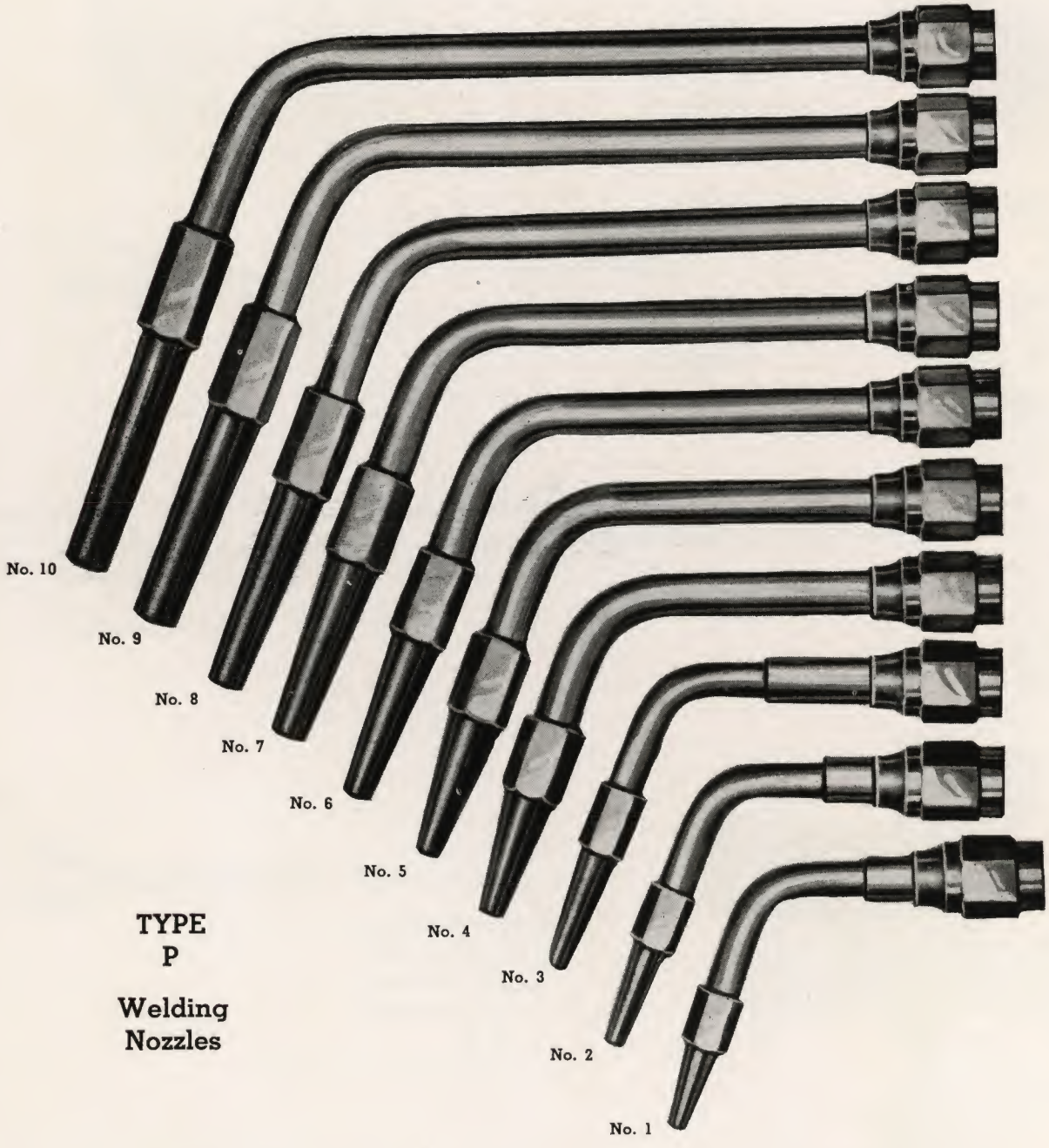
No. 50 Torch



No. 33 Lead Burning Torch

Simplex Vises are made with a steel slide. Ask us for prices. See pages 164 and 165.

National Welding Nozzles



Type P Welding Nozzles have one-piece copper elbows with nozzle points silver soldered to elbow.

These nozzles give the long straight cone and the soft, hot flame so much desired for welding. This is accomplished by the National Patented Mixer. Sizes 0 to 10 inclusive.....Price, each $3.00

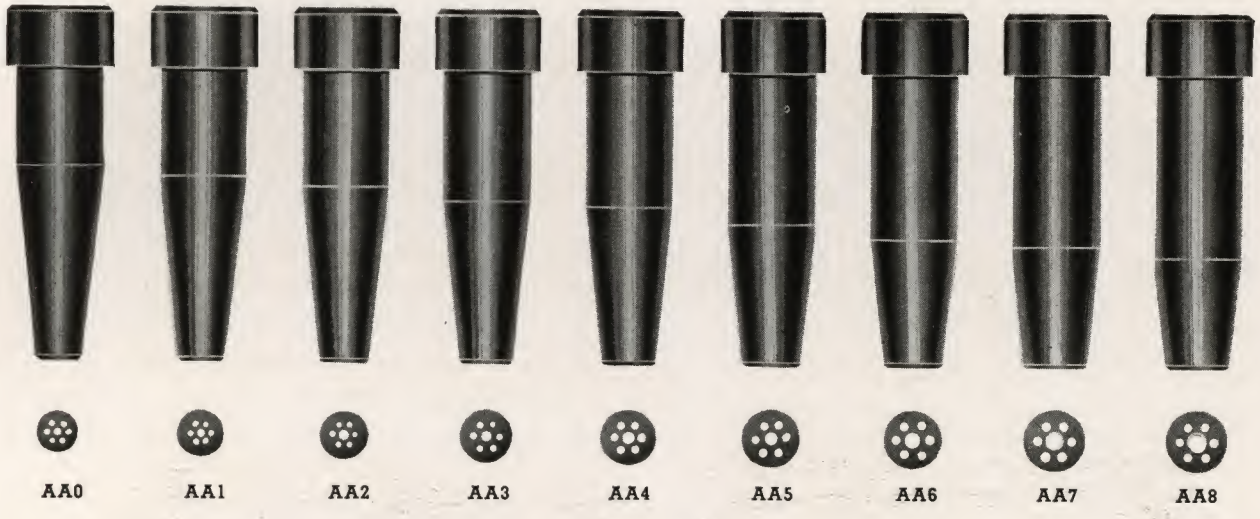
ASK FOR OUR COMPLETE CATALOG ON CUTTING AND WELDING APPARATUS.

National Cutting Tips

For No. 400 Cutting Torch and No. 200 Cutting Attachment

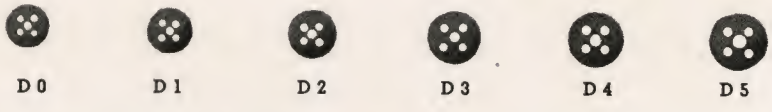
ACETYLENE CUTTING TIPS

For General Cutting

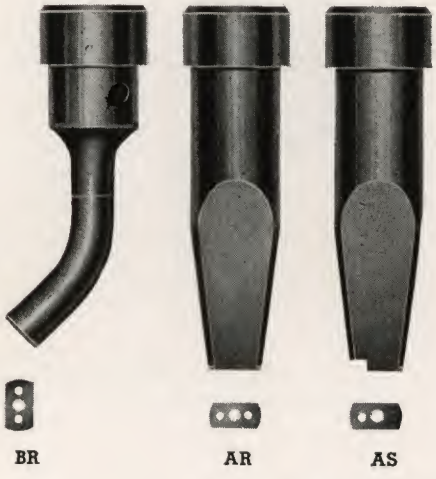


AA0	AA1	AA2	AA3	AA4	AA5	AA6	AA7	AA8
0 to ½"	1"	2½"	3"	5"	7"	9"	11"	14"

CUTTING CAPACITY



D 0 D 1 D 2 D 3 D 4 D 5



BR AR AS

AL tips made in sizes 3, 4, 5, 6.

BR tips made in sizes 1, 2, 3, 4.

AR tips made in sizes 0, 1, 2, 3, 4.

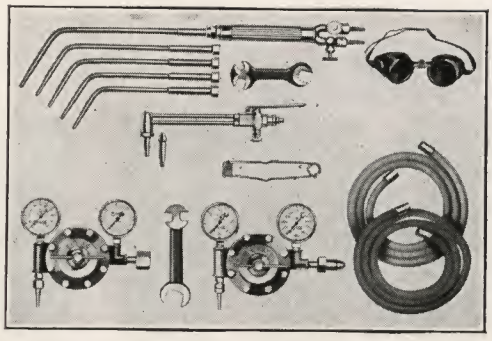
AS tips made in sizes 0, 1, 2, 3.

HYDROGEN CUTTING TIPS

Also used for Cast Iron Cutting (oxy-acetylene)

AH 0 AH 1 AH 2 AH 3 AH4 AH 5 AH 6 AH 7 AH 8

National Cutting Tips.....Each $3.50



Purox No. 4017 Combination Welding and Cutting Outfit

The No. 4017 Combination Outfit consists of:
No. 28 Torch with Nos. 3, 5, 7, 9 and 12 tips.
No. 10 Oxygen Regulator with 100-lb. and 3000-lb. gauges.
No. 30 Acetylene Regulator with 30-lb. and 500-lb. gauges.
No. 21 Cutting Attachment with 2 tips and adaptor.
12½ ft. ¼-in. green oxygen hose with ferrules.
12½ ft. ¼-in. red acetylene hose with ferrules.
No. 201 Goggles. No. 28-to-11 Tip Adaptor. Spark Lighter.
Wrenches. Instruction Manual.

Price.....$99.00

The No. 4017 Combination Welding and Cutting Outfit is complete welding and cutting equipment. It covers the entire welding range and has a cutting range up to two inches in thickness. It is a well balanced, moderately priced outfit assuring maximum utility, for job welding shops, garages, machine shops and manufacturing plants, where cutting requirements do not warrant the purchase of a separate cutting torch.

The No. 4017 Combination Outfit includes the same apparatus as the No. 4011 Welding Outfit with the addition of the No. 21 Cutting Attachment. The No. 28 Torch—the standard Purox welding torch with a full assortment of tips—and the heavy duty regulators are well matched in capacity and are substantially built to give long service under the most severe operating conditions. The No. 21 Cutting Attachment, while not intended for extremely heavy work, equips for all cutting usually encountered in average run-of-shop work.

Oxweld and Purox Hose

⅜" 2 Braid Corrugated Red Acetylene.
⅜" 2 Braid Corrugated Green Oxygen.

¼" 7 Ply Green Oxygen (25' & 50' Lengths.)
¼" 3 Braid Corrugated Green Oxygen.
¼" 2 Braid Corrugated Green Oxygen.
¼" 2 Braid Corrugated Red Acetylene.

$\frac{3}{16}$" 1 Braid Corrugated Green Oxygen.
$\frac{3}{16}$" 1 Braid Corrugated Red Acetylene.

PUROX FLUXES

The formulas for Purox fluxes were carefully worked out in the Union Carbide and Carbon Research Laboratories. They float out all impurities such as oxides and slag from the weld metal. They also form a scum or coating over the molten metal that effectively protects it from the oxidizing effect of the atmosphere while cooling.

Purox Brazing Flux for Brass and Bronze. Per lb.....$0.50
Purox Brazing Flux (red) for Cast Iron. Per lb..... 1.50
Purox Welding Flux for Cast Iron. Per lb..... .50

PUROX ALUMINUM FLUX

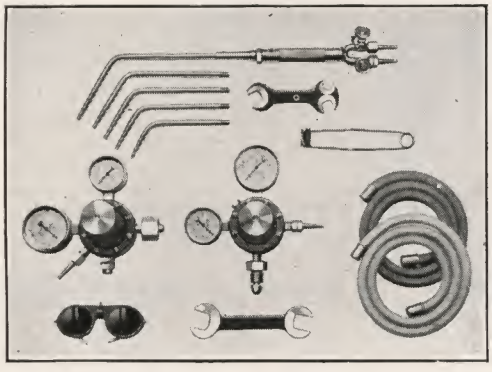
Purox Aluminum Flux (for drawn and cast). Per 6 oz. bottle.....$1.50

Van Dorn electric tools are the best by test. See page 166. Ask for complete catalogue.

We solicit your mill inquiries on all items in this Catalogue. We represent only reliable mills.

Northern California Distributors for Allegheny Stainless Steels, the pioneer in stainless steels.

Anything you do not see listed, telephone or ask our salesmen as we are adding new items all the time.



Purox No. 4008 Welding Outfit

The No. 4008 Outfit consists of:

No. 11 Welding Torch with Nos. 2, 4, 6, 8 and 10 tips and wrench.
No. 14 Oxygen Regulator with 100-lb. and 3000-lb. gauges & wrench.
No. 34 Acetylene Regulator with 50-lb. and 500-lb. gauges.
12½ ft. ¼-in. green oxygen hose with ferrules.
12½ ft. ¼-in. red acetylene hose with ferrules.
Purox Spectacles. Spark Lighter. Instruction Manual.

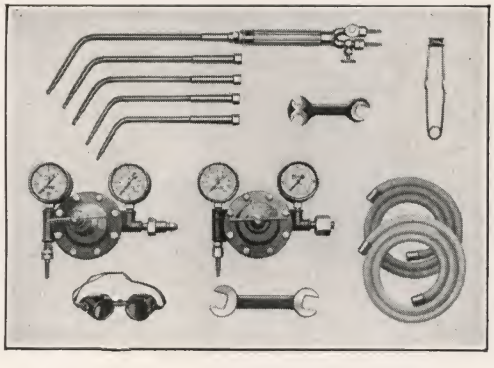
Price.....$57.00

No. 21 Cutting Attachment $18.00 extra.

Purox No. 4008 Welding Outfit

The No. 4008 Welding Outfit is recommended for the user whose volume of work lies in the light-to-medium range. It is an ideal, general purpose outfit, moderately priced and of high quality. It is extensively used by job welding shops, plumbing and heating contractors, manufacturers of metal products and especially by garages that require wide range and earning power in their standard equipment.

The built-in stamina and extreme flexibility of the No. 4008 Outfit enable it to carry a peak welding load. It performs over the entire welding range—except on the extremely heavy jobs. Users in every industry find that this versatility materially reduces their outlay for operating equipment. The torch and regulators in the No. 4008 Outfit are sturdily made to stay on the job a long time; they give smooth, efficient performance at a low operating cost.



Purox No. 4011 Welding Outfit

The No. 4011 Outfit consists of:

No. 28 Torch with Nos. 3, 5, 7, 9 and 12 tips.
No. 10 Oxygen Regulator with 100-lb. and 3000-lb. gauges.
No. 30 Actelylene Regulator with 30-lb. and 500-lb. gauges.
12½ ft. ¼-in. green oxygen hose with ferrules.
12½ ft. ¼-in. red acetylene hose with ferrules.
No. 201 Goggles. No. 28-to-11 Tip Adaptor. Spark Lighter.
Wrenches. Instruction Manual.

Price.....$82.00

Purox No. 4011 Welding Outfit

The No. 4011 Outfit is of all-around utility for job welding shops, garages, foundries, boiler, machine and blacksmith shops. Thoroughly dependable, well-balanced and unusually sturdy, it is a favorite in manufacturing plants where the maintenance of production schedules requires adequate welding equipment. It is designed for general purpose work and will handle the heaviest castings as efficiently as the jobs in the medium welding range. This adaptability makes for a far greater earning power than is usually possible with outfits of this type.

The torch and regulators in this outfit are large in size and capacity. They give the outfit a wide range and are built to stand up under the hardest every day service. The No. 4011 Welding Outfit is compact and readily portable. It may be mounted with cylinders on a two-wheel truck in readiness for instant use anywhere in or outside the shop.

Welding Rods and Spelter

TOBIN BRONZE RODS

36 Inch Lengths

For welding Cast Iron, Malleable Iron, Brass and Bronze.

Dia. Inch	1/8	3/16	1/4	3/8
Wtg. Lgth.	.134	.302	.536	1.21

PHOSPHOR BRONZE RODS

36 Inch Lengths

Extensively used for electrically welding Bronze Castings and Galvanized Iron.

Dia. Inch	1/8	3/16	1/4
Wt. Lgth.	.134	.305	.543

MANGANESE BRONZE RODS

36 Inch Lengths

For welding Brass and Bronze Castings.

Dia. Inch	1/8	3/16	1/4
Wgt. Lgth	.135	.305	.543

SILICON BRONZE

36 Inch Lengths

For welding Silicon Bronze Plates, Sheets, etc.

DRAWN BRASS RODS

36 Inch Lengths

For welding Cast and Sheet Brass.

Dia. Inch	1/16	3/32	1/8	3/16	1/4
Wgt. Lgth.	.031	.070	.135	.281	.500

SPELTER BRAZING SOLDER

Stocked in either Round or Long Grain.

In granulations from Fine to Coarse.

SOFT BRASS SPELTER WIRE

Random weight. Coils, 5 to 35 lbs.

B. & S. Ga.	2	4	6	8	10	12	14
Dia. Inch	.257	.205	.162	.128	.101	.080	.064
Wgt. Foot	.191	.120	.075	.047	.029	.018	.012

DEOXIDIZED COPPER

36 Inch Lengths

PHOSPHOR—COPPER ROD

36 Inch Lengths

A self-fluxing alloy of copper and phosphorus available in round rod form. For application on copper and copper base alloys. Used extensively in the manufacture of electrical equipment. This rod becomes extremely fluid at 1375° F.

Dia. Inch	1/16	1/8	3/16	and	1/4

DRAWN ALUMINUM RODS

36 Inch Lengths

For welding Sheet Aluminum.

Dia. Inch	1/8	1/4
Wgt. Lgth.	.042	.180

CAST ALUMINUM RODS

14 Inch Lengths

For welding Cast Aluminum.

Dia. Inch	1/8	1/4
Wgt. Lgth.	.016	.070

Iron and Steel Rods

BESSEMER COPPER COATED RODS

36 Inch Lengths

For welding Steel Plates, Sheets, Castings, Pipes, and Structural Shapes.

Dia. Inch	1/16	3/32	1/8	3/16	1/4
Wgt. Lgth.	.031	.070	.125	.281	.500

CAST IRON RODS

24 Inch Lengths

For welding Cast Iron.

Dia. Inch	1/8	3/16	1/4	5/16	3/8	1/2
Wgt. Lgth.	.085	.240	.340	.500	.760	.133

ALLEGHENY METAL STAINLESS STEEL

15 Inch Coated Welding Electrodes

36 Inch Bare Gas Welding Wire

Dia. Inch	1/16	3/32	1/8	5/32	3/16	1/4
Length	Weight per length					
15 Inch	.013	.029	.052	.082	.118	.209
36 Inch	.0313	.0703	.1251	.1959	.282	.501

This rod can also be supplied in Allegheny 33, 44, 55, or 66.

May also be supplied with Columbium content.

NICKEL STEEL RODS

36 Inch Lengths

For welding Cold Rolled, Shafting, Nickel, or Chrome Steel.

Dia. Inch	1/8	3/16	1/4
Wgt. Lgth.	.134	.302	.536

VANADIUM STEEL RODS

36 Inch Lengths

For welding Vanadium Alloys.

Dia. Inch	3/16	1/4
Wgt. Lgth.	.302	.536

STEEL WELDING WIRE

36 Inch Lengths

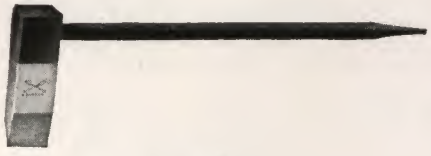
For welding Steel Tanks, Boilers, Barrels, etc.

Dia. Inch	1/16	3/32	1/8	3/16	1/4	5/16
Wgt. Lgth.	.033	.075	.134	.302	.536	.748

Soldering Coppers

Drawn Copper—Forged Handles

Pointed, Roofing, or Bottom Pattern



A
Rigid Hatchet

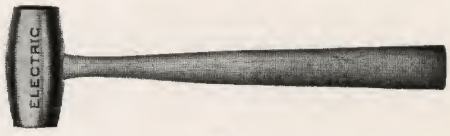
B
Swivel Hatchet

C
Pointed

D
Bottom

Weight, Per Pair: ½, ¾, 1, 1½, 2, 2½, 3, 4, 5, 6, 7, 8, 10, 12, and 14 Pounds.

Copper Hammers



E
Copper Hammers

Weight	Per Pound		Handles	Length of Handle
1 lb. Hammer	.05	plus base	.10	11"
1½ lb. Hammer	.04½	plus base	.12	12"
2 lb. Hammer	.04	plus base	.12	12"
2½ lb. Hammer	.03½	plus base	.13	14"
3 lb. Hammer	.03	plus base	.13	14"
4 lb. Hammer	.03	plus base	.15	16"
5 lb. Hammer	.03	plus base	.17	18"

F
Screw Type

Hexacon Electric Soldering Irons

The Ideal Iron for Industrial Use

G
Plug Type

Note these Points:

1. Heating element and insulation will stand up under continuous high temperature.
2. Replaceable, hard drawn copper tip, nickel-plated.
3. Case made of solid hexagon steel, (except 50 Watt size) affording it great mechanical strength.
4. Heating Element made of the best grade nickel-chromium resistance wire, insulated with mica.
5. Grip-tight Ferrule makes tool adjustable in length. Rigidly held in place in all positions.
6. Smooth, cool handle comfortably fits the hands.
7. Easily accessible terminal (inside handle) constructed to relieve cord strain on contact screws.
8. Underwriter's approved heater cord.
9. "Hexacon" products are guaranteed perfect in workmanship and material. There is no limit to our guarantee, we will make good any "Hexacon" product in which our investigation shows any manufacturing defect **no matter how long used.**

Will operate either on A. C. or D. C.

SCREW TYPE TIPS

Cat. No.	Watts	Tip Dia.	Type Tip Length	Weight Oz. Less Cord	Complete Iron	Price List Each: Extra Tip	Heating Element	Heating Head	Cord & Plug	Handle & Ferrule
50	50	7/16	Screw Adjustable	8	$ 3.50	$ .30	$1.75	$2.25	$ .60	$ .75
85	85	½	Screw Adjustable	12	6.00	.40	3.00	4.15	.60	.75
130	130	⅞	Screw Adjustable	15	8.00	.65	4.25	5.90	.60	.75
225	225	1⅛	Screw Adjustable	28	9.75	1.10	4.75	7.20	.60	.75
350	350	1⅜	Screw Adjustable	37	11.50	1.50	6.00	8.55	.60	.75
500	500	1⅝	Screw Adjustable	55	13.00	1.95	7.25	9.60	.60	.75

PLUG TYPE TIPS

Cat. No.	Watts	Tip Dia.	Type Tip Length	Shipping Weight Oz.	Complete Iron	Price List Each: Extra Tip	Heating Element	Heating Head	Cord & Plug	Handle & Ferrule
P 70	70	⅜	Plug Adjustable	16	$ 4.50	$ .25	$2.25	$3.30	$ .50	$ .35
P100	100	⅜	Plug Adjustable	18	5.50	.32	2.75	4.25	.50	.35
P125	130	⅝	Plug Adjustable	21	7.00	.60	3.50	5.45	.50	.35
P200	200	⅝	Plug Adjustable	24	8.00	.65	3.75	6.40	.50	.35
P300	300	⅞	Plug Adjustable	36	9.75	1.25	4.75	7.55	.50	.35
P550	550	1⅛	Plug Adjustable	60	12.00	1.75	6.00	9.30	.50	.35

REPLACEMENT TIP SERVICE

Screw Type Tips

Cat. No.	Tip Dia.	Price	Fits VULCAN Cat. Nos.	Fits ESICO Cat. Nos.
50	7/16	$ .30	10, 20 & 600	
85	½	.40	30, 40, 100 & 700	56 & 101
130	⅞	.65	50, 200 & 500	121 & 201
225	1⅛	1.10	70 & 300	
350	1⅜	1.50	80 & 400	350
500	1⅝	1.95	90 & 800	500

130 Tip Adapter, $.65, Permits use of No. 85 Tip in No. 130 Iron.

Plug Type Tips

Cat. No.	Tip Dia.	Price	Fits AMERICAN BEAUTY Cat. Nos.	Fits ESICO Cat. Nos.
100	⅜	$ .40	3138	85
200	⅝	.65	3158	205
300	⅞	1.25	3178	355
550	1⅛	1.95	3198	505

Sheet Metal Terminals

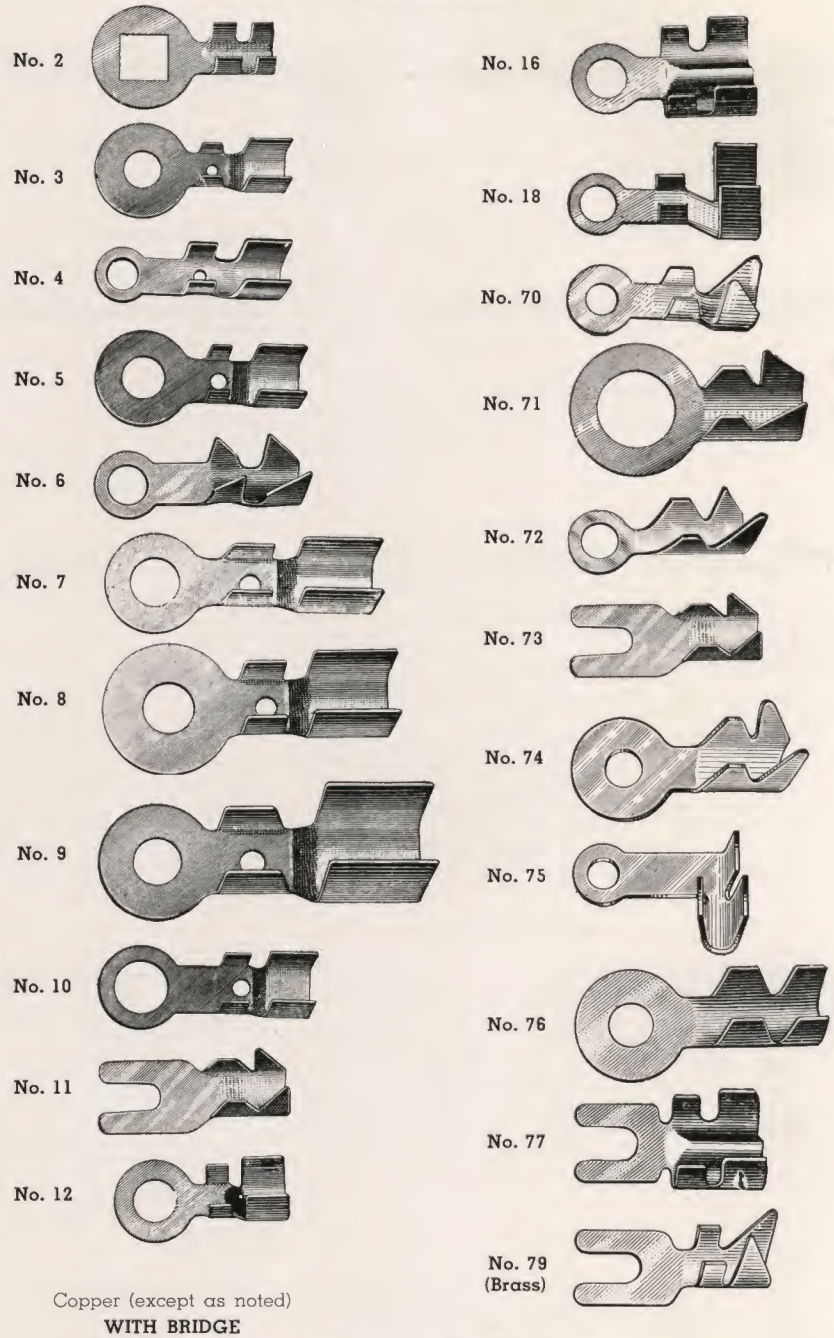
Part No.	Thickness	Dia. Stud Hole	Weight per 1000	Carton Qty.	List per 100
0	.022	3/16	2½	1000	$ .90
1	.025	3/16	3	1000	1.47
*1	.030	13/64	3¾	1000	1.77
1A	.030	3/16	4¾	1000	1.89
2	.030	¼	3½	1000	1.74
*3	.022	3/16	2¾	1000	1.26
3	.030	3/16	3¾	1000	1.59
3	.040	3/16	4¾	500	1.98
4	.022	13/64	2¼	1000	1.17
*4	.030	13/64	3	1000	1.44
4	.040	13/64	4	1000	1.71
*5	.022	13/64	3½	1000	1.59
5	.030	13/64	4¾	1000	1.86
5	.040	13/64	6	500	2.55
*6	.030	7/32	4½	500	1.74
6	.040	7/32	5½	500	2.22
*7	.022	¼	5¾	500	2.22
7	.030	¼	7¾	500	2.88
7	.040	¼	10¼	500	3.63
*8	.022	¼	6¼	500	2.37
8	.030	¼	9	500	3.21
8	.040	¼	12	500	4.29
9	.022	¼	11¾	250	4.30
*10	.030	9/32	4½	500	1.80
10	.040	9/32	5½	500	2.31
11	.030	13/64	3¾	500	1.71
12	.030	13/64	3½	1000	1.65
13	.025	13/64	3	1000	1.32
13A	.025	13/64	3¼	1000	1.53
14	.025	9/32	3¼	1000	1.56
15	.025	13/32	4½	500	1.77
16	.030	7/32	5¼	500	2.43
17	.030	7/32	5¼	500	2.52
18	.030	3/16	3½	1000	1.56
55	.025	¼	6	500	2.10
70	.022	13/64	2½	1000	1.20
*70	.030	13/64	3	1000	1.35
70	.040	13/64	3½	500	2.34
*71	.030	13/32	5½	500	2.34
71	.040	13/32	7	500	2.88
72	.025	3/16	4¾	1000	1.62
73	.030	11/64	3	1000	1.62
74	.040	13/64	6½	500	2.88
75	.030	11/64	6	500	4.83
76	.030	¼	5	500	2.52
77	.030	3/16	5¼	500	2.52
78	.030	3/16	5¼	500	2.52
79	.030	3/16	2½	1000	1.62

*Unless otherwise specified, terminals will be furnished in the weights marked(*).

Sheet Metal Terminals

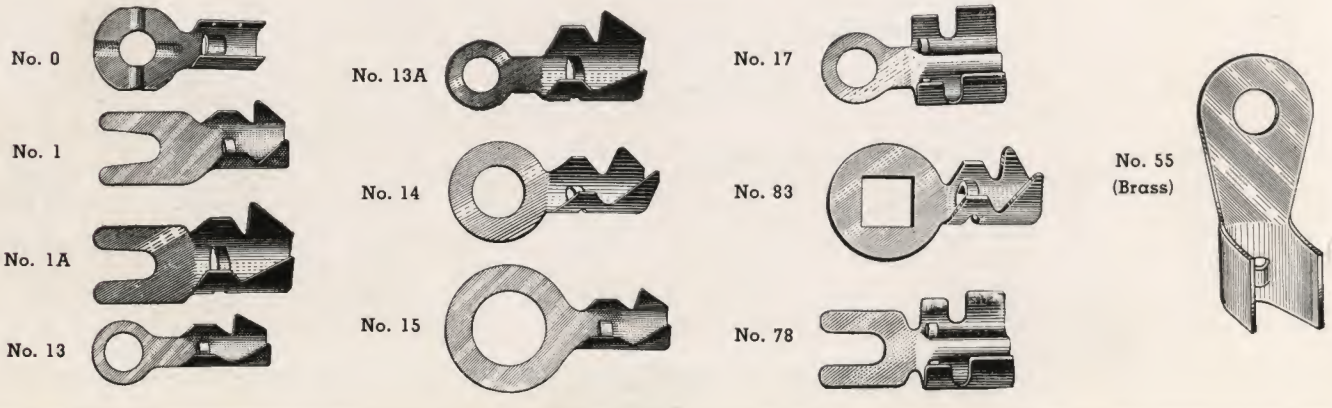
Copper (except as noted)

WITHOUT BRIDGE

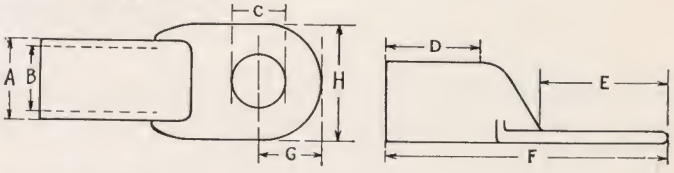


Copper (except as noted)

WITH BRIDGE



Side Formed Soldering Lugs



Part Number A	Amp. Cap. N. E. C.	Max. B&S (A.W.G.) Stranded Wire	APPROXIMATE DIMENSIONS IN INCHES B	C	E	F	G	Weight per 1000	Carton Qty.	List per 100
3/16	25	10	.1368	11/64	15/32	15/16	7/32	4	250	$ 2.43
*1/4	35	8	.186	13/64	1/2	1 1/32	7/32	6	200	2.85
*5/16	50	6	.232	13/64	19/32	1 7/32	1/4	11	200	4.41
*3/8	70	4	.285	9/32	11/16	1 11/32	9/32	17	125	4.95
*7/16	90	2	.336	9/32	3/4	1 1/2	11/32	24	100	6.75
*1/2	125	0	.398	11/32†	13/16	1 3/4	13/32	35	100	8.79
9/16	150	00	.461	13/32	15/16	2	7/16	46	100	11.28
5/8	175	000	.511	13/32†	1	2 1/8	1/2	60	100	15.60
11/16	225	0000	.559	13/32†	1 5/32	2 9/32	17/32	80	50	19.50
13/16	250	250,000CM	.651	13/32	1 1/4	2 5/8	5/8	120	25	38.40
15/16	325	400,000CM	.776	13/32	1 5/8	3 3/8	3/4	225	Bulk	57.00
1	362	450,000CM	.82	13/32	1 3/4	3 7/16	13/16	285	"	72.00
1 1/16	400	500,000CM	.88	13/32	2 1/8	4 1/16	15/16	380	"	89.40
1 1/8	450	600,000CM	.943	13/32	2 1/4	4 7/16	1	420	"	94.50
1 5/16	550	800,000CM	1.084	17/32	2 1/2	5	1 1/8	705	"	150.00
1 7/16	650	1,000,000CM	1.210	29/32	2 1/2	5 3/8	1 3/16	788	"	168.00
1 3/4	850	1,500,000CM	1.460	1 1/32	3 1/8	6 5/8	1 7/16	1470	.....	292.80
2 1/16	1050	2,000,000CM	1.660	1 1/32	3 5/8	7 1/2	1 5/8	2765	.....	474.00

To select Terminals according to N. E. C. Rating governing knife switches, use the following equivalents:

30 amperes—use 1/4" size
60 amperes—use 3/8" size
100 amperes—use 1/2" size
200 amperes—use 11/16" size
400 amperes—use 1 1/16" size
600 amperes—use 1 7/16" size
800 amperes—use 1 3/4" size
1,000 amperes—use 2 1/16" size

Part No.	Thickness	Dia. Stud Hole	Weight per 1000	Carton Qty.	List per 100
*19	.016	5/32	1	1000	$ .66
19	.030	5/32	1 1/2	1000	1.20
20	.016	5/32	1	1000	.66
21	.022	5/32	1	1000	.72
22	.016	13/64	1 1/4	500	.72
23	.016	3/16	1 1/4	500	.72
*24	.030	3/16	1 7/8	1000	1.20
24	.040	3/16	2 3/8	1000	1.47
25	.022	3/16	2	1000	.96
26	.030	7/32	2 1/2	1000	1.23
*27	.022	3/16	2 1/2	1000	1.26
27	.040	3/16	4 1/4	1000	1.74
29	.022	13/32	3 1/2	500	1.65
*29	.040	13/32	6 3/8	500	2.91
80	.094	13/32	34 1/4	250	6.69
80A	.094	13/32	34 1/2	250	7.44
81	.094	13/32	34 1/4	250	9.12
83	.025	1/4" sq.	3 1/4	1000	1.74
84	.100	13/32	75	250	13.50
85	.075	13/32	68	200	10.14
86	.026	.....	17	250	1.45

*Unless otherwise specified, terminals will be furnished in the weights marked (*).

SINGLE EAR TYPE

Copper (except as noted)


No. 19


No. 20


No. 21

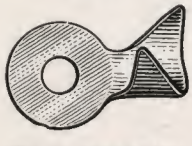

No. 22


No. 23

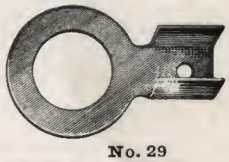

No. 24


No. 25


No. 26


No. 85 (Half Size)


No. 27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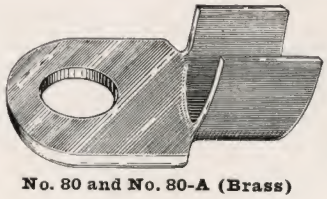
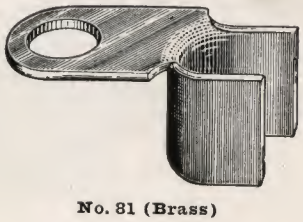
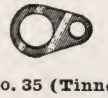

No. 80 and No. 80-A (Brass)


No. 81 (Brass)

FLAT TYPE


No. 34 (Tinned)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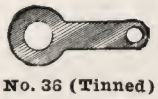
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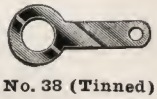
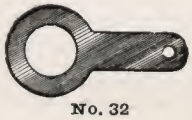

No. 38 (Tinned)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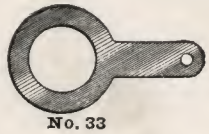
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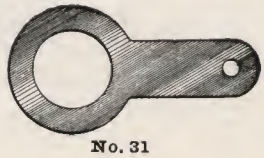

No. 31

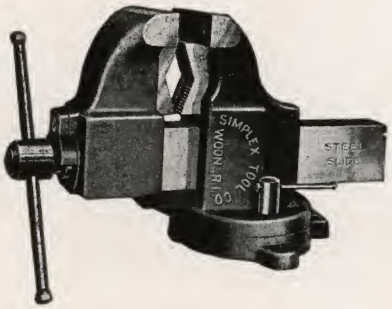
Simplex Steel Slide Vises

Note these features:

No. 1—STEEL vs. IRON. Simplex steel front jaw slide is unbreakable, being machined from a solid bar of steel.

No. 2—REMOVABLE JAW INSERTS. Usual screw fastenings reinforced by steel dowels, easily removed, simple in design, cannot work loose, made of tool steel carefully tempered.

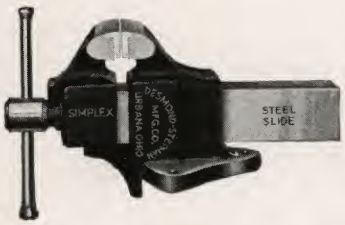
No. 3—SQUARE CUT SCREW. Made from high tensile strength steel with a machined, square cut thread, insures maximum pull.



COMBINATION PIPE VISE

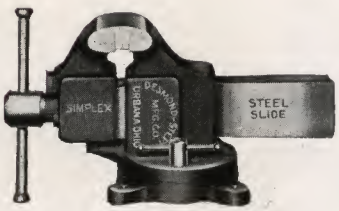
Furnished with or without Pipe Jaws.

No.	Jaw Inches	Wght. lbs.	Holds Pipe	Price Without Pipe Jaws	Price Complete
CP33	3¾"	46	⅛" to 2½"	$13.60	$16.00
CP43	4¾"	80	⅛" to 4"	18.60	22.00



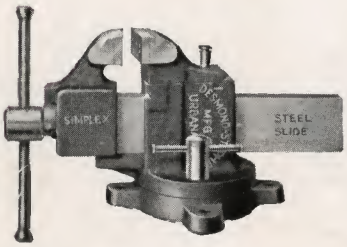
MACHINISTS' VISE—STATIONARY BASE

No.	Width of Jaw	Jaws Open	Wght. lbs.	List Price
31P	3¼"	4½"	21	$10.00
33P	3¾"	5"	30	11.25
41P	4¼"	6"	42	12.75
43P	4¾"	7"	60	15.50
51P	5¼"	8"	83	20.00
61P	6¼"	10"	122	39.00
71P	7¼"	12"	175	55.00
81P	8¼"	13"	231	75.00



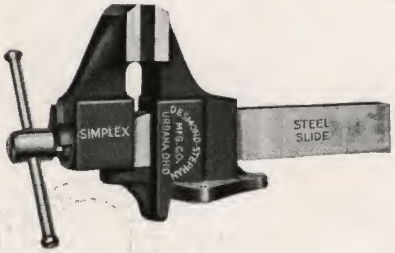
MACHINISTS' VISE—SWIVEL BASE

No.	Width of Jaw	Jaws Open	Wght. lbs.	List Price
31S	3¼"	4½"	25	$13.00
33S	3¾"	5"	36	15.00
41S	4¼"	6"	50	17.00
43S	4¾"	7"	72	20.00
51S	5¼"	8"	100	30.00
61S	6¼"	10"	146	52.00
71S	7¼"	12"	210	70.00



MACHINISTS' VISE—SWIVEL BASE—SWIVEL JAW

No.	Width of Jaw	Jaws Open	Wght. lbs.	List Price
41SJ	4¼"	6"	56	$24.00
43SJ	4¾"	7"	75	28.00



COACHMAKERS' VISE

No.	Width of Jaw	Jaws Open	Wght. lbs.	List Price
42CP	4½"	11"	69	$17.50

Steel Slides used in Simplex Vises only are lighter and four times stronger.

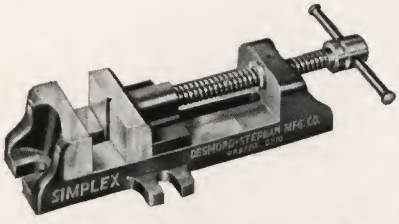
STAINLESS STEEL Rivets, Screws, Cap Screws, Nuts, Cotters, Washers, Escutcheon Pins, etc., can be supplied from stock or from factory.

The Simplex Utility Vise

The best low-price vise ever made.

No.	Width of Jaw	Jaw Opens	Wgt. Lbs.	List Price
		Without Swivel Base		
30	3⅛"	4"	10	$2.20
		With Swivel Base		
100	3"	3¼"	12	3.00
350	3½"	4½"	19	4.50
400	4"	5"	25	7.50
500	5"	7"	27	8.50

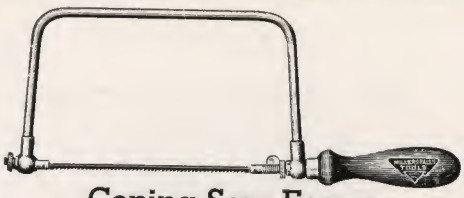
The only utility vise with Steel Slide and enclosed Screw.



Simplex Drill Press and Milling Machine Vise

A strong, well built, low priced vise that is indispensable on every drill press and milling machine.

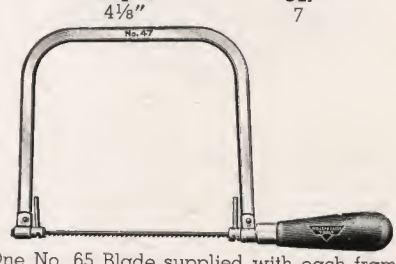
Width of jaws	3½ Inches
Maximum opening	4½ "
Overall length	12½ "
Weight	16 Pounds
List price, each	$8.00



Coping Saw Frame

Holds No. 60 and No. 65 Blades.
Three No. 60 Blades supplied with each frame.

No.	Throat Depth	Wgt. Oz.	Price Each
42	4⅛"	7	$1.60



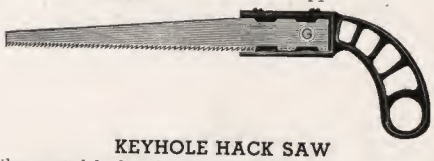
One No. 65 Blade supplied with each frame.

No.	Throat Depth	Wgt. Oz.	Price Each
47	6½"	9	$ .90

No. 60 and No. 65 COPING SAW BLADES

Pin pattern blades are heavier, cut faster and straighter and will outwear the finer tooth blades.

No.	Size	Wgt. Per Gross Oz.	Price Per Gross
60	6 x 3/32"	9	$2.50
65	6½ x 3/32"	11	2.50



KEYHOLE HACK SAW

Cuts nails, metal lath, plaster board, stucco, armored cable, conduit, packing, bakelite, fibre, wood, etc.

No.	Blade Length	Overall Length	Weight	Price Each
237	5½"	9½"	4 ozs.	$ .25
7	Extra blades, per dozen			1.45

Universal Flexible Hand Hack Saw Blades

23 Gauge—.025" thick steel

Length Inch	Teeth Per Inch	Width Inch	Price Per Gross Tungsten	Blu-Mol	High Speed
8	18–24–32	7/16	$ 8.00		
10	14–18–24–32	½	10.00		
10	18–24–32	½	.....	$40.00	
10	18–24–32	9/16	.....	.....	$40.32
12	14–18–24–32	½	12.00	48.00	.....
12	14–18–24–32	9/16	13.50	.....	.....
12	18–24–32	9/16	.....	.....	48.96

Universal Power Hack Saw Blades

Length Inch	Teeth Per Inch	Width Inch	Thickness Gauge	Price Per Gross Tungsten	Blu-Mol	High Speed
10	10	¾	.049–18	$ 20.40		
12	14–18	¾	.032–21	19.44		
12	10–14	¾	.049–18	24.48		
12	10–14	1	.049–18	32.64		
12	14–18	⅝	.032–21	16.20		
12	14	1	.049–18	.....	$120.96	$172.80
12	6–10	1	.065–16	.....	120.96	172.80
14	10–14	¾	.049–18	28.56	.....	.....
14	10–14	1	.049–18	38.08	.....	.....
14	14	1	.049–18	.....	141.12	201.60
14	6–10	1	.065–16	.....	141.12	201.60
14	4– 6–10	1¼	.065–16	58.80	176.40	252.00
17	10–14	1	.049–18	46.24	.....	.....
17	14	1	.049–18	.....	171.36	244.80
17	6–10	1	.065–16	.....	171.36	244.80
17	4– 6–10	1¼	.065–16	71.40	214.20	306.00
18	10	1	.065–16	.....	181.44	259.20
18	6–10	1¼	.065–16	75.60	.....	.....
18	4– 6–10	1¼	.065–16	.....	226.80	324.00
21	4– 6–10	1½	.065–16	105.84	317.52	453.60
24	6–10	1½	.065–16	120.96	362.88	518.40

Van Dorn Electric Tools

New ¼-Inch Junior Drill

$19.50

The New ¼" Junior (above) drives twist drills for drilling up to ¼" holes in metal; augers for drilling up to ½" holes in wood. Also drives wheels for light grinding, buffing, wire brushing, polishing, etc. A practical, handy tool that will make short work of a thousand-and-one odd jobs around the shop, home or garage. Light in weight. Smooth in design. Easy to handle. Powerful Universal motor. Sturdy aluminum housing. **Compo** oil-less bearings. Sliding thumb switch. Three-jaw key chuck. Dependable Van Dorn construction throughout. A great buy at its sensationally low price.

¼-Inch Standard Drill

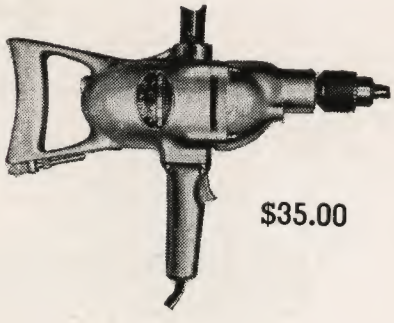
$31.00

An ideal tool for the shop that is using a ¼" drill continuously, and where the applications are not heavy enough to justify the purchase of a heavy duty drill.

A very popular drill for driving valve guide brushes, carbon cleaning brushes, and valve seat hones. It is also suitable for use as a small bench grinding outfit for light grinding, tool sharpening, buffing, and wire wheelbrushing.

Speed—No load, 2,000 R.P.M. Full load, 1,350 R.P.M.
Drilling Capacity—¼ inch in steel.
Equipment—3-jaw Jacobs chuck, 3-conductor cable and plug.
Weight—5½ lbs. Shipping weight—7 lbs.
Overall length—11¾ inches.
Motor—Universal Type. Operates on A. C. or D. C. Standard Voltage, 110.
Other Voltages, 32, 220 or 250, furnished at no extra charge.

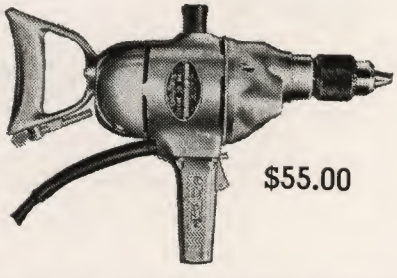
New ½-Inch Junior Drill



$35.00

The New ½" Junior (above) drives twist drills for drilling up to ½" holes in steel; augers for drilling up to 1¼" holes in wood. Also drives hole saws for cutting clean, round holes, from ¾" to 3½" diameter, in wood, metal or composition. A husky, he-man tool that will make quick work of so many tough jobs you'll wonder how you ever got along without it. Smoothly designed. Perfectly balanced. Easy to handle. Powerful Universal motor. Husky aluminum housing. All-purpose spindle speed. Triple gear reduction for plenty of torque. **Compo** oil-less bearings. Safety switch. Three-jaw Jacobs chuck. Real Van Dorn quality. Now's your chance to buy a great drill at a really small price.

½-Inch Standard Drill

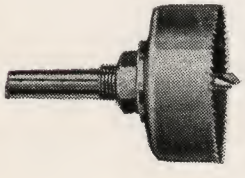


$55.00

Compact design, light weight and correct spindle speed, which varies according to load, make this ½-inch drill adaptable to all forms of maintenance work. Millwrights, garagemen, electricians . . . maintenance men in every field refer to it as an old standby. Use it to drill in cast iron, steel or wood; with hole saws or for driving spring-expanded cylinder hones. When used with a ½-inch bench stand it makes an excellent drill press. This electric drill ably covers the entire field of maintenance work. Equipped with powerful Van Dorn motor, ball-bearing armature and spindle thrust, and automatic safety switch.

Speed—No load, 400 R.P.M. Full load, 300 R.P.M.
Drilling capacity—½ inch in steel.
Equipment—Combination spade and breast plate handle, 3-jaw Jacobs chuck, 3-conductor cable and plug.
Weight—15 lbs. Shipping weight—20 lbs.
Overall length—16⅝ inches.
Furnished with No. 1 or No. 2 Morse Taper Socket, $5 extra.
Motor—Universal Type. Operates on A. C. or D. C. Standard Voltage, 110.
Other Voltages, 32, 220 or 250, furnished at no extra charge.

Hole Saws

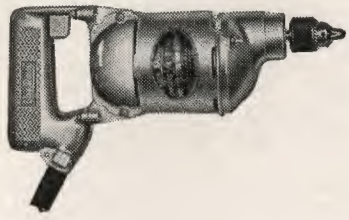


For use with ½, ⅝ and ¾" Electric Drills.
For Hole sizes ¾" to 4", also mandrels and pilot drills.

Saw Sizes	Price Each	Saw Sizes	Price Each
¾, ⅞, or 1"	$ .65	2¼, 2⅜, or 2½"	$1.40
1⅛, 1¼, 1⅜, or 1½"	.85	2⅝, 2¾, or 2⅞"	1.50
1⅝, 1¾, or 1⅞"	1.00	3, 3⅛, 3¼, or 3½"	1.65
2, 2 1/16, or 2⅛"	1.20	4"	2.00

Ask for catalogue showing complete "Van Dorn" portable tool line.

¼-Inch Heavy Duty Electric Drill



$43.00

The ¼" Heavy Duty Drill is the most economical unit, from every standpoint, for heavy duty drilling on continuous production work.

A ball bearing tool built according to Van Dorn standards of workmanship.

Speed—No load, 2,000 R.P.M. Full load, 1,200 R.P.M.

Drilling capacity—¼ inch in steel.

Equipment—3-jaw Jacobs chuck, 3-conductor cable and plug.

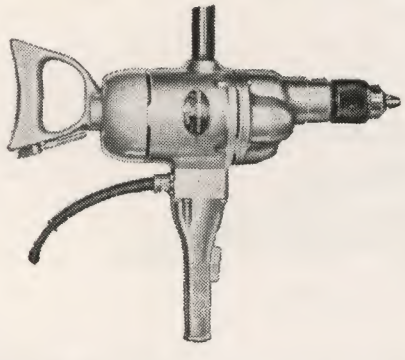
Weight—7 lbs. Shipping weight—9 lbs.

Overall length—12½ inches.

Motor—Universal Type. Operates on A. C. or D. C. Standard Voltage, 110.

Other Voltages, 32, 220 or 250, furnished at no extra charge.

Heavy Duty Electric Drill



Once you handle this sturdy Van Dorn tool you will recognize a pleasing difference in the way it drills. So powerful that it cannot be stalled, even when drilling up to its maximum capacity in tough steel.

Typical Van Dorn power and highest type anti-friction construction that is rugged and sturdy. Ball bearings used on armature shaft and spindle thrust. These bearings assure frictionless, long-time duty under the most gruelling conditions.

This heavy duty drill is ideal for all types of automotive maintenance work, such as driving cylinder hones, etc. Automatic safety switch, hardened alloy steel gears.

½"	Heavy Duty	$ 68.00
⅝"	Heavy Duty	78.00
¾"	Heavy Duty	90.00
⅞"	Heavy Duty	96.00
1"	Heavy Duty	115.00

⅞" and 1" Drills equipped with No. 2 and No. 3 Morse Taper Sockets, respectively.

Motor—Universal Type. Operates on A. C. or D. C. Standard Voltage, 110. Other Voltages, 32, 220 or 250, furnished at no extra charge.

Wire Wheel Brushes

For cleaning castings; moulds of all kinds; gears; dry and storage battery parts; welds; scale from forged and hardened parts; brass and copper before brazing; paint from automobile bodies, stoves, etc. These Van Dorn Brushes are rigid and compact and are made of the proper gauge, spring tempered wire for each size. They have a wide face; maximum number of wires, perfect balance and long life.

No.	Diameter	Hole	Price
704	4"	½ or ⅜	$1.50
706	6"	†	2.50
707	7"	†	3.25
708	8"	†	3.50
710	10"	†	6.00
712	12"	†	8.00

Extra Arbor Hole Adaptors, per pair.....$0.20

†Arbor hole Adaptors furnished for ⅜", ½", ⅝", ¾", ⅞", 1", 1⅛", 1¼", 1⅜", 1½" and 1¾". Specify size wanted.

Grinding Wheels

A complete line of replacement grinding wheels for Van Dorn units are obtainable. These are carried in the following sizes in the grades indicated.

Cat. No.	Dia.	Description Width	Hole	Grade	Price
DAG133	2½"	½"	⅜"	36	$0.95
92951	6"	½"	½"	60K	2.00
92950	6"	½"	½"	36G	2.00
95183	6"	¾"	½"	60K	2.50
13950	6"	¾"	½"	36G	2.50
99064	7"	¾"	½"	60K	3.00
99063	7"	¾"	½"	36G	3.00
14235	7"	1"	⅝"	60K	3.75
14236	7"	1"	⅝"	36G	3.75
10275	10"	1"	¾"	40K	6.00
10274	10"	1"	¾"	24H	6.00
VR533	4"	½"	⅝"	40K	2.75
12985	4"	½"	⅝"	40K	2.50
96772	4"	¾"	½"	36G	1.75
93042	5"	¾"	½"	36G	2.00
93148	6"	1"	⅝"	36G	3.00
10033	10"	1½"	¾"	20G	7.50
00306	3"	½"	½"	40L	1.00
10663	4"	¾"	½"	36H	2.50

6-INCH SPECIAL BENCH GRINDER

For all voltages, Single phase, 50-60 Cycle A.C. $24
For all voltages, Single phase, 25-40 Cycle A.C. $28

A Van Dorn grinder at a price that everyone can afford. It will pay to "spot" these units around the shop, and save the time otherwise lost when a man has to hunt for a grinder to sharpen his tools.

Built to give satisfaction. All rotating parts are carefully balanced, and armature shaft is mounted in "Compo" oilless bearings. Rubber feet make it unnecessary to bolt machine down for light grinding. The lifting handle makes it convenient to carry the grinder to the job when necessary. Attractively painted in red enamel.

Wheel guards are adjustable for grinding at any position on the circumference of the wheel.

Equipment includes two grinding wheels, adjustable tool rests and wheel guards, toggle switch and 3-conductor cable.

Motor—Not Universal. Can be supplied for all A. C., single phase voltages and cycles. Cannot be furnished for D. C.

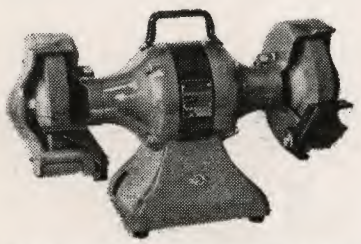
R. P. M.—1500 for 25 cycles, 2400 for 40 cycles, 3000 for 50 cycles, 3600 for 60 cycles.

Wheel Size—6" diameter x 1/2" face x 1/2" hole.

Weight—36 lbs. Shipping Weight—49 lbs.

Replacement Grinding Wheels and Additional Equipment—

No. 50000 Pedestal for 6" Grinder $17.50
No. 92951 6" x 1/2" x 1/2", Grade 60K 2.00
No. 92950 6" x 1/2" x 1/2", Grade 36G 2.00
No. 96664 Spindle Extension, R. H. thread 4.40
No. 96665 Spindle Extension, L. H. thread 4.40
No. 93565 Tapered Buffing Spindle 3.85



6-INCH HEAVY DUTY BALL BEARING BENCH GRINDER

A completely new grinder of the popular "wide-type" construction.

Extended wheel spindle and tapered housing increase the accessibility of this unit for grinding large and odd-shaped pieces.

Wheel guards are completely enclosed. End cover can be removed for changing wheels and for wire brushing. Guards are adjustable radially for grinding in any position.

Tool rests, attached to the wheel guards are quickly adjusted to compensate for wheel wear.

Rubber feet on base make bolting to bench unnecessary. Convenient carrying handle is standard equipment.

Full size grease-sealed ball bearings, set close to ends of spindle, reduce vibration.

A full-powered grinder, for tool sharpening, wire brushing, polishing, buffing and general shop work.

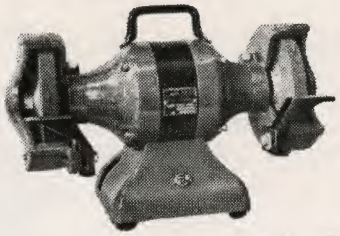
Specifications

Wheel Size ..... 6" diameter x 3/4" face x 1/2" hole
Motor—Not Universal. Supplied for 110 or 220 volt, 50-60 cycle, single phase A. C. and all D. C. voltages, up to and including 250 volts, only. Motor Rating, 1/4 H. P.
R.P.M.
No-load Speed—for D. C. and 60 cycle A. C. 3,600
for 50 cycle A. C. 3,000
Net Weight ..... 43 lbs. Shipping Weight ..... 54 lbs.
Over-all Spindle Length ..... 14 3/4"
STANDARD EQUIPMENT—3-conductor cable and plug, toggle switch in base; carrying handle, rubber feet; two adjustable wheel guards with tool rests; two 6" grinding wheels, 1 medium, 1 fine.

$42
Complete for All Voltages

ACCESSORIES

No. 15315 6" x 3/4" x 1/2" Grinding Wheel, medium (36 G) ..... $ 2.50
No. 15314 6" x 3/4" x 1/2" Grinding Wheel, fine (60 K) 2.50
No. 706 6" Wire Wheel Brush 2.50
No. 96664 Spindle Extension (Right Hand) 4.40
No. 96665 Spindle Extension (Left Hand) 4.40
No. 93565 Tapered Buffing Spindle (Right Hand only) 3.85
No. 50000 Pedestal, complete with water pot 17.50



6-Inch Portable Grinder

Portable Electric Grinders

Into these new units, Van Dorn engineers have built the most advanced principles of Portable Grinder design. Of greatest interest to the user is the increased power of these units over previous models of similar rated capacity. Full size ball bearings are set at the extreme ends of the wheel spindle to withstand the abnormal side thrust and insure long service. Armature shaft is also mounted on ball bearings. Another important contribution to trouble-free service is the fully enclosed commutator compartment which thoroughly protects the commutator, brushes, and switch from abrasive dust. Improved ventilating system is accomplished by providing ample air slots which prevent clogging and insure cool motor operation. All three sizes of Portable Grinders are equipped with horizontal switch handles which improve the balance of the tool and facilitate easy handling. Shaped grips permit firmer grasp and eliminate any tendency of the tool to turn in the operator's hands. Adjustable wheel guards can be turned for grinding in any desired position.

	4-Inch Portable Grinder	5-Inch Portable Grinder	6-Inch Portable Grinder
Wheel size	4"x3/4"x1/2"	5"x3/4"x1/2"	6"x1"x5/8"
No-load speed	4500 R. P. M.	3800 R. P. M.	3300 R. P. M.
Net weight	12 3/4 lbs.	15 1/2 lbs.	23 1/2 lbs.
Shipping weight	17 lbs.	28 1/2 lbs.	35 1/2 lbs.
Over-all length	23"	23 3/4"	25 1/2"
Price all Voltages	$60.00	$80.00	$100.00

Standard equipment (for all sizes): 3-conductor cable and plug; plunger switch; adjustable wheel guard and one grinding wheel.

Universal Motors, operate on A. C. or D. C.

Standard voltage, 110; also available for 220 or 250 volts, no extra charge.

ACCESSORIES

No. 96772 4" x 3/4" x 1/2" (Med. 36G) Wheel $1.75
No. 93042 5" x 3/4" x 1/2" (Med. 36G) Wheel 2.00
No. 93148 6" x 1" x 5/8" (Med. 36G) Wheel 3.00
No. 704 4" Wire Wheel Brush 1.50
No. 706 6" Wire Wheel Brush 2.50

Flex-Disc Sanders

7" Heavy Duty Sander

Completely redesigned, with many important structural improvements. The commutator and switch are completely dust-sealed and protected against abrasive dust and dirt. A new plunger type of switch improves control of the unit and eliminates accidental starting. Non-clog ventilation through ample air-vents prevents overheated motor. Reversible side handle can be used for either right- or left-hand operation. Flexible pad adapts unit to flat or curved surfaces.

Amply powered for constant heavy-duty service in production and maintenance metal finishing, lacquer rubbing, rust and paint removing, stone and tile surfacing; wood surfacing and shaping with planer heads; scaling tanks, boat hulls, etc., with wire brush, smooth-welds and casting ridges with cup grinding wheel.

Diameter of Flexible Sanding Pad ..... 7"
Spindle diameter ..... 5/8" Spindle thread ..... 11 thr.
No-Load Speed ..... 4,200 R. P. M.
Weight: Net ..... 12 1/4 lbs. Shipping ..... 18 lbs.
Overall length (not including pad) ..... 17 1/2"
Equipment: 3-conductor cable and plug; detachable side handle; 7" flexible felt and metal pad; twelve 7" sanding discs (4 coarse, 4 medium, 4 fine).

$75
Complete for All Voltages

ACCESSORIES

No. 12947 7" Flexibel Pad, complete ..... $ 7.00
No. 12684 7" Replacement Assembly 2.25
No. 12980 7" Felt Rubbing Pad 1.50
No. 14237 3" Flexible Pad, complete 4 00
No. 14238 5" Flexible Pad, complete 6 00
No. 14734 Gouging Planer Head 11.00
No. 14735 Surfacing Planer Head 11 00
No. 14743 Planer Head Set 20 00
No. 12398 Cup Wire Brush 4.50
No. 10663 Cup Grinding Wheel 2.50

Sanding and emery discs, and other accessories, pages 31 and 32.

All Motors—Universal Type—Operate on either A. C. or D. C. **Standard Voltage—110. Also available for 220 or 250 volts, no extra cost.**

Taper Shank Twist Drills

American No. 1303A High Speed Steel
Shanks smaller than regular.

Diam. Inch	Whole Lgth. Inch	Twist Cut Inch	Morse Taper Shank No.	Price Each
31/64	7 11/16	4 3/8	1	$ 2.75
1/2	7 11/16	4 3/8	1	2.75
33/64	7 15/16	4 5/8	1	3.05
17/32	7 15/16	4 5/8	1	3.05
35/64	8 3/16	4 7/8	1	3.50
9/16	8 3/16	4 7/8	1	3.50
51/64	10	6 1/8	2	6.75
13/16	10	6 1/8	2	6.75
53/64	10	6 1/8	2	7.15
27/32	10	6 1/8	2	7.15
55/64	10	6 1/8	2	7.50
7/8	10	6 1/8	2	7.50
57/64	10	6 1/8	2	7.85
29/32	10	6 1/8	2	7.85
1 5/64	11 1/2	6 7/8	3	12.20
1 3/32	11 1/2	6 7/8	3	12.20
1 7/64	11 3/4	7 1/8	3	13.15
1 1/8	11 3/4	7 1/8	3	$13.15
1 9/64	11 7/8	7 1/4	3	13.85
1 5/32	11 7/8	7 1/4	3	13.85
1 11/64	12	7 3/8	3	14.55
1 3/16	12	7 3/8	3	14.55
1 13/64	12 1/8	7 1/2	3	15.25
1 7/32	12 1/8	7 1/2	3	15.25
1 15/64	12 1/2	7 7/8	3	16.65
1 1/4	12 1/2	7 7/8	3	16.65
1 33/64	15	9 3/8	4	26.35
1 17/32	15	9 3/8	4	26.35
1 35/64	15 1/4	9 5/8	4	28.20
1 9/16	15 1/4	9 5/8	4	28.20
1 37/64	15 9/16	9 15/16	4	30.10
1 19/32	15 9/16	9 15/16	4	30.10
1 39/64	15 11/16	10 1/16	4	31.25
1 5/8	15 11/16	10 1/16	4	31.25
1 41/64	15 13/16	10 3/16	4	$32.40
1 21/32	15 13/16	10 3/16	4	32.40
1 43/64	15 13/16	10 3/16	4	33.55
1 11/16	15 13/16	10 3/16	4	33.55
1 45/64	15 13/16	10 3/16	4	34.70
1 23/32	16 1/4	10 3/16	4	34.70
1 47/64	16 1/4	10 3/16	4	37.00
1 3/4	16 1/4	10 3/16	4	37.00
1 25/32	16 1/4	10 3/16	4	38.20
1 13/16	16 5/16	10 3/16	4	39.40
1 27/32	16 5/16	10 3/16	4	40.55
1 7/8	16 1/2	10 3/8	4	42.75
1 29/32	16 1/2	10 3/8	4	43.95
1 15/16	16 5/8	10 3/8	4	45.45
1 31/32	16 5/8	10 3/8	4	46.65
2	16 5/8	10 3/8	4	47.85

Straight Shank Taper Length Twist Drills

American No. 1314 High Speed Steel

Diam. Inch	Dec. Equiv.	Lgth. Overall Inches	Twist Cut Inch	Price Each
1/8	.125	5 1/8	2 1/2	$1.00
9/64	.1406	5 1/4	2 3/4	1.10
5/32	.1562	5 3/8	3	1.10
11/64	.1718	5 1/2	3 1/4	1.25
3/16	.1875	5 3/4	3 1/2	1.25
13/64	.2031	5 7/8	3 3/4	1.35
7/32	.2187	6	4	1.35
15/64	.2343	6 1/8	4	1.40
1/4	.250	6 1/8	4	1.40
17/64	.2656	6 1/4	4	1.50
9/32	.2812	6 1/4	4	1.50
19/64	.2968	6 3/8	4 1/16	1.60
5/16	.3125	6 3/8	4 1/16	1.60
21/64	.3281	6 1/2	4 1/8	1.70
11/32	.3437	6 1/2	4 1/8	1.70
23/64	.3593	6 3/4	4 1/4	1.90
3/8	.375	6 3/4	4 1/4	1.90
25/64	.3906	7	4 3/8	2.10
13/32	.4062	7	4 3/8	2.10
27/64	.4218	7 1/4	4 5/8	2.30
7/16	.4375	7 1/4	4 5/8	2.30
29/64	.4531	7 1/2	4 7/8	2.50
15/32	.4687	7 1/2	4 7/8	2.50
31/64	.4843	7 3/4	5	2.75
1/2	.500	7 3/4	5	2.75
33/64	.5156	8	5 1/4	3.05
17/32	.5312	8	5 1/4	3.05
35/64	.5468	8 1/4	5 3/8	$3.50
9/16	.5625	8 1/4	5 3/8	3.50
37/64	.5781	8 1/2	5 5/8	4.00
19/32	.5937	8 1/2	5 5/8	4.00
39/64	.6093	8 3/4	5 3/4	4.25
5/8	.625	8 3/4	5 3/4	4.25
41/64	.6406	9	5 7/8	4.75
21/32	.6562	9	5 7/8	4.75
43/64	.6718	9 1/4	6	5.25
11/16	.6875	9 1/4	6	5.25
45/64	.7031	9 1/2	6 3/16	5.75
23/32	.7187	9 1/2	6 3/16	5.75
47/64	.7343	9 3/4	6 3/8	6.25
3/4	.750	9 3/4	6 3/8	6.25
49/64	.7656	9 7/8	6 1/2	6.50
25/32	.7812	9 7/8	6 1/2	6.50
51/64	.7968	10	6 5/8	6.75
13/16	.8125	10	6 5/8	6.75
53/64	.8281	10 1/4	6 3/4	7.15
27/32	.8437	10 1/4	6 3/4	7.15
55/64	.8593	10 1/2	7	7.50
7/8	.875	10 1/2	7	7.50
57/64	.8906	10 5/8	7	7.85
29/32	.9062	10 5/8	7	7.85
59/64	.9218	10 3/4	7	8.85
15/16	.9375	10 3/4	7	8.85
61/64	.9531	10 7/8	7 1/8	9.65
31/32	.9687	10 7/8	7 1/8	$ 9.65
63/64	.9843	11	7 3/16	10.25
1	1.	11	7 3/16	10.25
1 1/64	1.0156	11 1/8	7 5/16	11.00
1 1/32	1.0312	11 1/8	7 5/16	11.00
1 3/64	1.0468	11 1/4	7 3/8	11.75
1 1/16	1.0625	11 1/4	7 3/8	11.75
1 5/64	1.0781	11 1/2	7 5/8	12.20
1 3/32	1.0937	11 1/2	7 5/8	12.20
1 7/64	1.1093	11 3/4	7 7/8	13.15
1 1/8	1.125	11 3/4	7 7/8	13.15
1 9/64	1.1406	11 7/8	8	13.85
1 5/32	1.1562	11 7/8	8	13.85
1 11/64	1.1718	12	8 1/8	14.55
1 3/16	1.1875	12	8 1/8	14.55
1 13/64	1.2031	12 1/8	8 1/8	15.25
1 7/32	1.2187	12 1/8	8 1/8	15.25
1 15/64	1.2343	12 1/2	8 1/2	16.65
1 1/4	1.250	12 1/2	8 1/2	16.65
1 9/32	1.2812	14 1/8	9 1/8	20.00
1 5/16	1.3125	14 1/4	9 1/4	20.75
1 11/32	1.3437	14 3/8	9 3/8	21.50
1 3/8	1.375	14 1/2	9 1/2	22.25
1 13/32	1.4062	14 5/8	9 1/2	23.00
1 7/16	1.4375	14 3/4	9 5/8	23.75
1 15/32	1.4687	14 7/8	9 3/4	24.50
1 1/2	1.500	15	9 7/8	25.25

Straight Shank Drills

Jobber's Lengths

American No. 1330 High Speed Steel

Diam. Inch	Dec. Equiv. Inch	Lgth. Over all Inches	Twist Cut Inch	Price Per Doz.
1/16	.0625	2 1/2	1 1/4	$3.00
5/64	.0781	2 5/8	1 3/8	3.10
3/32	.0937	2 3/4	1 1/2	3.20
7/64	.1093	2 7/8	1 11/16	3.40
1/8	.125	3	1 13/16	3.60
9/64	.1406	3 1/8	1 15/16	3.90
5/32	.1562	3 1/4	2 3/32	4.20
11/64	.1718	3 3/8	2 7/32	4.50
3/16	.1875	3 1/2	2 5/16	4.85
13/64	.2031	3 5/8	2 7/16	5.25
7/32	.2187	3 3/4	2 17/32	$ 5.75
15/64	.2343	3 7/8	2 21/32	6.25
1/4	.250	4	2 3/4	6.75
17/64	.2656	4 1/8	2 7/8	7.50
9/32	.2812	4 1/4	2 31/32	8.25
19/64	.2968	4 3/8	3 3/32	9.00
5/16	.3125	4 1/2	3 3/16	9.75
21/64	.3281	4 5/8	3 5/16	10.75
11/32	.3437	4 3/4	3 13/32	11.75
23/64	.3593	4 7/8	3 17/32	12.75
3/8	.375	5	3 5/8	$13.75
25/64	.3906	5 1/8	3 3/4	15.00
13/32	.4062	5 1/4	3 27/32	16.25
27/64	.4218	5 3/8	3 31/32	17.50
7/16	.4375	5 1/2	4 1/16	18.75
29/64	.4531	5 5/8	4 3/16	20.00
15/32	.4687	5 3/4	4 9/32	21.25
31/64	.4843	5 7/8	4 13/32	22.75
1/2	.500	6	4 1/2	24.25

Straight Shank Drills

Letter Sizes

American No. 1332 High Speed Steel

Size by Gauge	Dec. Equiv. Inch	Lgth. Over all Inches	Twist Cut Inch	Price Per Doz.
A	.234	3 13/16	2 19/32	$6.25
B	.238	3 13/16	2 19/32	6.55
C	.242	3 13/16	2 19/32	6.55
D	.246	3 13/16	2 19/32	6.75
E	.250	3 13/16	2 9/16	6.75
F	.257	4 1/4	3	7.50
G	.261	4 1/4	3	7.50
H	.266	4 1/4	3	8.00
I	.272	4 1/4	3	8.00
J	.277	4 1/4	3	$ 8.00
K	.281	4 1/4	3	8.25
L	.290	4 1/4	2 31/32	8.75
M	.295	4 1/4	2 31/32	9.00
N	.302	4 1/4	2 31/32	9.50
O	.316	4 1/4	2 15/16	10.45
P	.323	4 1/2	3 3/16	10.75
Q	.332	4 5/8	3 5/16	11.75
R	.339	4 5/8	3 5/16	11.75
S	.348	4 3/4	3 13/32	$12.75
T	.358	4 3/4	3 13/32	12.75
U	.368	4 7/8	3 17/32	13.75
V	.377	5	3 5/8	14.65
W	.386	5	3 5/8	15.00
X	.397	5 1/8	3 3/4	15.85
Y	.404	5 1/8	3 3/4	15.85
Z	.413	5 1/4	3 27/32	17.10

Straight Shank Wire Drills

American No. 1340 High Speed Steel

No. by Gauge	Decimal Equiv. Inch	Approx. Length Inches	Twist Cut Inches	Price Per Doz.
1	.2280	4	2 21/32	$6.45
2	.2210	3 15/16	2 5/8	6.45
3	.2130	3 15/16	2 5/8	6.15
4	.2090	3 7/8	2 19/32	5.95
5	.2055	3 13/16	2 9/16	5.95
6	.2040	3 13/16	2 17/32	5.95
7	.2010	3 3/4	2 1/2	5.45
8	.1990	3 11/16	2 15/32	5.45
9	.1960	3 11/16	2 7/16	5.45
10	.1935	3 5/8	2 3/8	5.25
11	.1910	3 9/16	2 11/32	5.25
12	.1890	3 9/16	2 5/16	5.25
13	.1850	3 1/2	2 9/32	4.85
14	.1820	3 7/16	2 1/4	4.85
15	.1800	3 7/16	2 9/32	4.85
16	.1770	3 3/8	2 3/16	4.65
17	.1730	3 5/16	2 5/32	4.65
18	.1695	3 5/16	2 1/8	4.50
19	.1660	3 1/4	2 3/32	4.35
20	.1610	3 3/16	2 1/16	4.35
21	.1590	3 3/16	2 1/16	$4.35
22	.1570	3 1/8	2	4.15
23	.1540	3 1/16	1 31/32	4.05
24	.1520	3 1/16	1 15/16	4.05
25	.1495	3	1 29/32	3.90
26	.1470	2 15/16	1 7/8	3.90
27	.1440	2 15/16	1 27/32	3.90
28	.1405	2 7/8	1 13/16	3.60
29	.1360	2 13/16	1 3/4	3.60
30	.1285	2 13/16	1 23/32	3.60
31	.1200	2 3/4	1 11/16	3.30
32	.1160	2 11/16	1 5/8	3.30
33	.1130	2 11/16	1 5/8	3.30
34	.1110	2 5/8	1 9/16	3.15
35	.1100	2 9/16	1 1/2	3.15
36	.1065	2 9/16	1 1/2	3.10
37	.1040	2 1/2	1 7/16	2.95
38	.1015	2 7/16	1 3/8	2.95
39	.0995	2 7/16	1 11/32	2.95
40	.0980	2 3/8	1 11/32	2.80
41	.0960	2 5/16	1 5/16	$2.80
42	.0935	2 5/16	1 1/4	2.75
43	.0890	2 1/4	1 7/32	2.60
44	.0860	2 3/16	1 3/16	2.60
45	.0820	2 3/16	1 1/8	2.60
46	.0810	2 1/8	1 1/8	2.50
47	.0785	2 1/16	1 3/32	2.50
48	.0760	2 1/16	1 1/16	2.50
49	.0730	2	1	2.50
50	.0700	1 15/16	31/32	2.40
51	.0670	1 15/16	15/16	2.40
52	.0635	1 7/8	7/8	2.40
53	.0595	1 13/16	13/16	2.40
54	.0550	1 13/16	27/32	2.40
55	.0520	1 3/4	13/16	2.40
56	.0465	1 11/16	25/32	2.40
57	.0430	1 11/16	23/32	2.40
58	.0420	1 5/8	23/32	2.40
59	.0410	1 5/16	11/16	2.40
60	.0400	1 5/16	11/16	2.40

Compton Tinners' Snips

Reliance Highest Quality Regular Tinners' Snips

Steel Drop Forged—Straight Blades

Bar Tool Steel Laid Blades. Blue Finish Handles.
The Length of Cut is the Standard Cutting Edge of Blade.

Number	7*	8*	9*	10*	11*	12*
Full Length	14"	13"	12"	11"	9"	8"
Length of Cut	4"	3½"	3"	2½"	2¼"	2"

CURVED BLADES

Number	6½CB	7CB	8CB	9CB*	10CB	11CB	12CB
Full lgth.	15½"	14"	13"	12"	11"	9"	8"
Lgth. of Cut	4½"	4"	3½"	3"	2½"	2¼"	2"

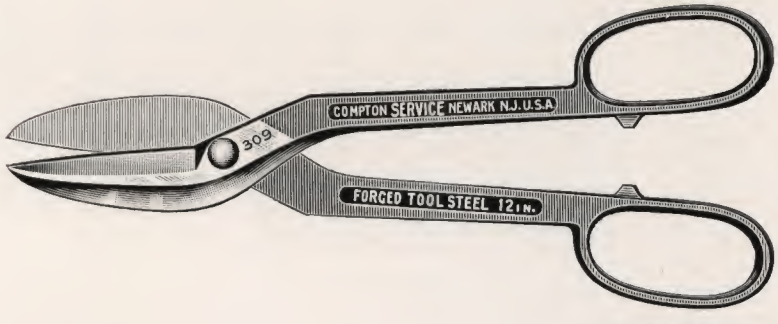
RELIANCE HIGHEST QUALITY HANDY TINNERS' SNIPS

Steel Drop Forged—Straight Blades.

Bar Tool Steel Laid Blades. Blue Finish Handles.

The Length of Cut is the Standard Cutting Edge of Blade. This snip is adapted for Cornice makers and an all around combination tool cutting circular, straight and irregular shapes.

Number	17	18*	19*	110*
Full Length	14"	13"	12"	11"
Length of Cut	4"	3½"	3"	2½"



SERVICE SNIPS

Forged Tool Steel

Number	309*	310*
Full Length	12"	11"
Length of Cut	3"	2½"

RELIANCE AUTO POCKET SNIPS

Bar Tool Steel Laid Blades. Blue Finish Handles.

This cutting tool, built for all around work, is indispensable for the automobile owner, will cut straight and irregular shapes, and the handles are formed to give the greatest leverage and strength.

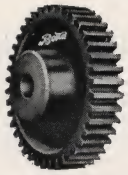
Number	111*
Full Length	7½"
Length of Cut	2"

RELIANCE DENTAL OR JAPANNED FLORIST SNIPS

	Serrated Edge	Plain Edge
Number	833*	832*
Full Length	7½"	7½"
Length of Cut	2½"	2"

*Denotes Sizes Carried in Stock.

If it is "Metals" you need—see us.



Bond Cut Steel Spur Gears

In ordering state Symbol and Number of Teeth.

16 Diam. Pitch—.1963" Circ. Pitch—½" Face

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Keyway	Type	List Price
S16S	12	.75	3/8	....	....	.....	Plain	$ .50
S16SU	12	.75	3/8	1/2	7/16	.....	Plain	.70
S16SK	12	.75	3/8	....	....	1/16x1/32	Plain	.60
S16S	13	.812	3/8	....	....	.....	Plain	.54
S16SU	13	.812	3/8	21/32	7/16	.....	Plain	.75
S16SK	13	.812	3/8	....	....	1/16x1/32	Plain	.65
S16S	14	.875	3/8	....	....	.....	Plain	.58
S16SU	14	.875	1/2	23/32	7/16	.....	Plain	.75
S16SK	14	.875	3/8	....	....	1/16x1/32	Plain	.65
S16SKZ	14	.875	1/2	....	....	1/8x1/16	Plain	.65
S16S	15	.937	1/2	....	....	.....	Plain	.60
S16S	16	1.0	1/2	....	....	.....	Plain	.65
S16SU	16	1.0	1/2	13/16	7/16	.....	Plain	.85
S16SUZ	16	1.0	9/16	13/16	7/16	.....	Plain	.85
S16SK	16	1.0	3/8	....	....	1/16x1/32	Plain	.75
S16SKZ	16	1.0	9/16	....	....	1/8x1/16	Plain	.75
S16S	18	1.125	1/2	....	....	.....	Plain	.70
S16SU	18	1.125	1/2	15/16	7/16	.....	Plain	1.00
S16SK	18	1.125	3/8	....	....	1/16x1/32	Plain	.85
S16SKZ	18	1.125	5/8	....	....	1/8x1/16	Plain	.85
S16S	20	1.25	1/2	....	....	.....	Plain	.75
S16SU	20	1.25	1/2	1	7/16	.....	Plain	1.15
S16SK	20	1.25	3/8	....	....	1/16x1/32	Plain	1.00
S16SKZ	20	1.25	5/8	....	....	1/8x1/16	Plain	1.00
S16S	22	1.375	1/2	....	....	.....	Plain	.80
S16S	24	1.5	1/2	....	....	.....	Plain	.85
S16SU	24	1.5	1/2	1 1/4	7/16	.....	Plain	1.30
S16SK	24	1.5	3/8	....	....	1/16x1/32	Plain	1.10
S16SKZ	24	1.5	3/4	....	....	3/16x3/32	Plain	1.10

20 Diam. Pitch—.1571" Circ. Pitch—⅜" Face

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Type	List Price
S20S	12	.6	5/16	....	....	Plain	$ .40
S20S	13	.65	5/16	....	....	Plain	.45
S20S	14	.7	5/16	....	....	Plain	.45
S20S	15	.75	5/16	....	....	Plain	.50
S20S	16	.8	5/16	....	....	Plain	.50
S20S	18	.9	3/8	....	....	Plain	.55
S20S	20	1.0	3/8	....	....	Plain	.60
S20S	22	1.1	3/8	....	....	Plain	.65
S20S	24	1.2	3/8	....	....	Plain	.70
S20S	25	1.25	3/8	....	....	Plain	.75
S20S	28	1.4	3/8	....	....	Plain	.80

24 Diam. Pitch—.1309" Circ. Pitch—¼" Face

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Type	List Price
S24S	12	.5	1/4	....	....	Plain	.34
S24S	14	.583	1/4	....	....	Plain	.36
S24S	15	.625	1/4	....	....	Plain	.38
S24SN	16	.666	5/16	....	....	Plain	.40
S24SN	18	.75	5/16	....	....	Plain	.45
S24SN	20	.833	3/8	....	....	Plain	.50
S24SN	21	.875	3/8	....	....	Plain	.55
S24SN	22	.916	3/8	....	....	Plain	.58
S24S	24	1.0	3/8	....	....	Plain	.60
S24SZ	24	1.0	1/2	....	....	Plain	.60
S24S	28	1.166	3/8	....	....	Plain	.62
S24S	30	1.25	3/8	....	....	Plain	.65
S24SZ	30	1.25	1/2	....	....	Plain	.65
S24S	32	1.333	3/8	....	....	Plain	.65

32 Diam. Pitch—.0982" Circ. Pitch—3/16" Face

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Type	List Price
S32S	16	.5	3/16	....	....	Plain	.28
S32S	18	.562	3/16	....	....	Plain	.30
S32SN	20	.625	1/4	....	....	Plain	.32
S32SN	22	.687	1/4	....	....	Plain	.34
S32SN	24	.75	5/16	....	....	Plain	.36
S32SN	26	.812	5/16	....	....	Plain	.38
S32SN	28	.875	3/8	....	....	Plain	.40
S32SN	30	.937	3/8	....	....	Plain	.50
S32SN	32	1.0	3/8	....	....	Plain	.55
S32SN	36	1.125	3/8	....	....	Plain	.58
S32SN	40	1.25	3/8	....	....	Plain	.60

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Keyway	Type	List Price
S16S	28	1.75	1/2	....	....	.....	Plain	$1.05
S16SU	28	1.75	1/2	1 1/2	1/2	.....	Plain	1.50
S16SK	28	1.75	5/8	....	....	1/8x1/16	Plain	1.30
S16S	30	1.875	1/2	....	....	.....	Plain	1.10
S16S	32	2.0	1/2	....	....	.....	Plain	1.20
S16SU	32	2.0	1/2	1 1/2	1/2	.....	Plain	1.75
S16SK	32	2.0	5/8	....	....	1/8x1/16	Plain	1.50
S16SU	36	2.25	1/2	1 5/8	1/2	.....	Plain	1.90
S16SK	36	2.25	5/8	....	....	1/8x1/16	Plain	1.65
S16SU	40	2.50	1/2	1 5/8	1/2	.....	Plain	2.00
S16SK	40	2.5	5/8	....	....	1/8x1/16	Plain	1.75
S16SK	42	2.625	5/8	....	....	1/8x1/16	Plain	1.80
S16SK	44	2.75	5/8	....	....	1/8x1/16	Plain	1.90
S16SU	48	3.0	1/2	1 3/4	1/2	.....	Plain	2.50
S16SK	48	3.0	5/8	....	....	1/8x1/16	Plain	2.00
S16SU	56	3.5	1/2	1 3/4	1/2	.....	Plain	3.00
S16SK	56	3.5	5/8	....	....	1/8x1/16	Plain	2.50
S16SU	64	4.0	3/4	2	1/2	.....	Plain	3.50
S16SK	64	4.0	7/8	....	....	3/16x3/32	Plain	3.00
S16SU	72	4.5	3/4	2	1/2	.....	Plain	4.00
S16SK	72	4.5	7/8	....	....	3/16x3/32	Plain	3.50
S16SU	80	5.0	3/4	2	1/2	.....	Webbed	4.50
S16SK	80	5.0	7/8	....	....	3/16x3/32	Plain	4.00
S16SU	88	5.5	3/4	2 1/4	1/2	.....	Webbed	5.00
S16SK	88	5.5	7/8	....	....	3/16x3/32	Plain	4.25
S16SU	96	6.0	3/4	2 1/4	1/2	.....	Webbed	5.50
S16SK	96	6.0	7/8	....	....	3/16x3/32	Plain	4.50

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Type	List Price
S20S	30	1.5	3/8	....	....	Plain	$ .80
S20SU	32	1.6	3/8	7/8	1/2	Plain	.95
S20SU	36	1.8	3/8	7/8	1/2	Plain	1.00
S20SUN	40	2.	1/2	1 3/8	1/2	Plain	1.10
S20SU	42	2.1	1/2	1 1/2	1/2	Plain	1.20
S20SU	44	2.2	1/2	1 1/2	1/2	Plain	1.30
S20SU	45	2.25	1/2	1 1/2	1/2	Plain	1.35
S20SU	48	2.4	1/2	1 1/2	1/2	Plain	1.45
S20SUN	50	2.5	1/2	1 1/2	1/2	Plain	1.50
S20SUN	60	3.0	1/2	1 3/4	1/2	Plain	2.00

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Type	List Price
S24S	36	1.5	3/8	....	....	Plain	.75
S24S	40	1.666	3/8	....	....	Plain	.80
S24S	42	1.75	3/8	....	....	Plain	.90
S24S	44	1.833	3/8	....	....	Plain	.95
S24S	45	1.875	3/8	....	....	Plain	1.00
S24S	48	2.0	3/8	....	....	Plain	1.05
S24S	54	2.25	3/8	....	....	Plain	1.15
S24S	56	2.33	3/8	....	....	Plain	1.20
S24S	60	2.5	1/2	....	....	Plain	1.25
S24S	63	2.625	1/2	....	....	Plain	1.30
S24S	64	2.666	1/2	....	....	Plain	1.35
S24S	66	2.75	1/2	....	....	Plain	1.40
S24S	70	2.916	1/2	....	....	Plain	1.45
S24S	72	3.0	1/2	....	....	Plain	1.50

Symbol	Teeth	Pitch Dia.	Hub Bore	Hub Dia.	Hub Proj.	Type	List Price
S32SN	44	1.375	3/8	....	....	Plain	.65
S32SN	48	1.5	3/8	....	....	Plain	.70
S32SN	52	1.625	3/8	....	....	Plain	.75
S32S	56	1.75	3/8	....	....	Plain	.85
S32S	60	1.875	3/8	....	....	Plain	.95
S32S	64	2.0	3/8	....	....	Plain	1.00
S32S	72	2.25	3/8	....	....	Plain	1.10
S32S	80	2.5	3/8	....	....	Plain	1.15
S32S	88	2.75	3/8	....	....	Plain	1.25
S32S	96	3.0	3/8	....	....	Plain	1.35

Bond Cut Iron Spur Gears

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Type	List Price
16 Diam. Pitch—.1963" Circ. Pitch—½" Face							
R16SN	36	2.25	½	1¼	½	Plain	$1.25
R16SN	40	2.5	½	1¼	½	Plain	1.30
R16SN	42	2.625	½	1¼	½	Plain	1.35
R16SN	44	2.75	½	1¼	½	Plain	1.40
R16SN	48	3.0	½	1¼	½	Webbed	1.45
R16SN	54	3.375	½	1¼	½	Webbed	1.50
R16SN	56	3.50	½	1¼	½	Webbed	1.55
R16SN	60	3.75	½	1⅜	½	Webbed	1.60
R16S	64	4.0	½	1½	½	Webbed	1.65
R16S	66	4.125	½	1½	⅝	Spoked	1.70
R16S	70	4.375	½	1½	⅝	Spoked	1.75
R16S	72	4.5	½	1½	⅝	Spoked	1.80
R16S	80	5.0	½	1½	⅝	Spoked	1.95
R16S	84	5.25	½	1½	⅝	Spoked	2.00
R16S	88	5.5	½	1½	⅝	Spoked	2.05
R16S	90	5.625	½	1½	⅝	Spoked	2.15
R16S	96	6.0	½	1½	⅝	Spoked	2.25
R16S	98	6.125	⅝	1½	⅝	Spoked	2.30
R16S	100	6.25	⅝	1½	⅝	Spoked	$2.35
R16SN	108	6.75	⅝	1½	⅝	Spoked	2.45
R16SN	110	6.875	⅝	1½	⅝	Spoked	2.50
R16SN	112	7.0	⅝	1½	⅝	Spoked	2.55
R16SN	120	7.5	⅝	1½	¾	Spoked	2.65
R16SN	126	7.875	⅝	1½	¾	Spoked	2.75
R16SN	128	8.0	⅝	1½	¾	Spoked	2.85
R16SN	132	8.25	⅝	1½	¾	Spoked	3.00
R16SN	140	8.75	⅝	1½	¾	Spoked	3.15
R16S	144	9.0	⅝	1¾	¾	Spoked	3.25
R16S	156	9.75	⅝	1¾	¾	Spoked	3.65
R16S	160	10.	⅝	1¾	¾	Spoked	3.75
R16S	168	10.5	⅝	2	¾	Spoked	3.95
R16S	176	11.0	¾	2	¾	Spoked	4.05
R16S	180	11.25	¾	2	¾	Spoked	4.10
R16S	192	12.	¾	2	¾	Spoked	4.25
R16S	200	12.5	¾	2	¾	Spoked	4.75
20 Diam. Pitch—.1571" Circ. Pitch—⅜" Face							
R20S	50	2.5	⅜	1⅛	½	Plain	$1.20
R20S	54	2.7	⅜	1⅛	½	Plain	1.25
R20S	56	2.8	⅜	1⅛	½	Plain	1.28
R20S	60	3.0	⅜	1¼	½	Webbed	1.30
R20S	64	3.2	⅜	1¼	½	Webbed	1.34
R20S	66	3.3	⅜	1¼	½	Webbed	1.38
R20S	70	3.5	⅜	1¼	½	Webbed	1.40
R20S	72	3.6	⅜	1¼	½	Webbed	1.44
R20S	75	3.75	⅜	1¼	½	Webbed	1.48
R20S	80	4.0	⅜	1¼	½	Webbed	1.50
R20S	84	4.2	⅜	1¼	½	Webbed	1.54
R20S	88	4.4	⅜	1¼	½	Webbed	1.56
R20S	90	4.5	½	1¼	½	Webbed	1.60
R20S	96	4.8	½	1¼	½	Spoked	1.65
R20S	98	4.9	½	1¼	½	Spoked	1.70
R20SN	100	5.0	½	1¼	½	Spoked	1.75
R20SN	105	5.25	½	1¼	½	Spoked	1.80
R20SN	108	5.4	½	1¼	½	Spoked	1.85
R20SN	110	5.5	½	1¼	½	Spoked	1.90
R20SN	112	5.6	½	1¼	½	Spoked	1.95
R20S	120	6.	½	1½	½	Spoked	2.00
R20S	126	6.3	½	1½	½	Spoked	2.05
R20S	128	6.4	½	1½	½	Spoked	2.10
R20S	132	6.6	½	1½	½	Spoked	2.15
R20S	135	6.75	½	1½	½	Spoked	2.20
R20S	140	7.0	½	1½	½	Spoked	2.25
R20S	144	7.2	½	1½	½	Spoked	2.30
R20S	150	7.5	½	1⅝	⅝	Spoked	2.35
R20S	154	7.7	½	1⅝	⅝	Spoked	2.40
R20S	156	7.8	½	1⅝	⅝	Spoked	2.45
R20S	160	8.0	½	1⅝	⅝	Spoked	2.50
R20S	165	8.25	½	1⅝	⅝	Spoked	2.60
R20S	168	8.4	½	1⅝	⅝	Spoked	2.65
R20S	176	8.8	½	1⅝	⅝	Spoked	2.70
R20S	180	9.0	½	1⅝	⅝	Spoked	2.75
R20S	192	9.6	⅝	1¾	¾	Spoked	3.00
R20S	200	10.0	⅝	1¾	¾	Spoked	3.25

Bond Finished Brass Spur Gears

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Type	List Price
16 Diam. Pitch—.1963" Circ. Pitch—$\frac{5}{16}$" Face							
B16S	8	.500	$\frac{3}{16}$	....	....	Plain	$ .28
B16S	9	.562	$\frac{3}{16}$	....	....	Plain	.30
B16S	10	.625	¼	....	....	Plain	.35
B16S	12	.750	¼	....	....	Plain	.40
B16S	14	.875	¼	....	....	Plain	.45
B16S	16	1.00	¼	....	....	Plain	.50
B16S	18	1.125	¼	....	....	Plain	.60
B16S	20	1.250	¼	....	....	Plain	.70
B16S	22	1.375	¼	....	....	Plain	.80
B16SN	24	1.50	$\frac{5}{16}$	....	....	Plain	$ .90
B16SN	28	1.75	$\frac{5}{16}$	....	....	Plain	1.00
B16SN	32	2.00	$\frac{5}{16}$	¾	$\frac{5}{16}$	Plain	1.20
B16SN	40	2.50	$\frac{5}{16}$	¾	$\frac{5}{16}$	Webbed	1.40
B16SN	48	3.00	$\frac{5}{16}$	¾	$\frac{5}{16}$	Webbed	1.60
B16SN	56	3.50	⅜	⅞	⅜	Webbed	1.80
B16S	64	4.00	⅜	1	⅜	Spoked	2.00
B16S	80	5.00	⅜	1	⅜	Spoked	2.50
B16SN	96	6.00	½	1	$\frac{7}{16}$	Spoked	3.00
24 Diam. Pitch—.1309" Circ. Pitch—¼" Face							
B24S	12	.500	$\frac{3}{16}$	⅜	¼	Plain	.28
B24S	14	.583	$\frac{3}{16}$	$\frac{7}{16}$	¼	Plain	.30
B24S	16	.666	$\frac{3}{16}$	½	¼	Plain	.35
B24S	18	.750	$\frac{3}{16}$	½	¼	Plain	.40
B24S	20	.833	¼	⅝	¼	Plain	.50
B24S	24	1.00	¼	⅝	¼	Plain	.50
B24S	30	1.250	¼	⅝	¼	Plain	.60
B24S	36	1.500	¼	⅝	¼	Plain	.70
B24S	40	1.666	¼	⅝	¼	Plain	.80
B24S	42	1.750	$\frac{5}{16}$	⅝	¼	Plain	.80
B24SN	48	2.00	$\frac{5}{16}$	$\frac{11}{16}$	$\frac{5}{16}$	Plain	.90
B24SN	54	2.25	$\frac{5}{16}$	$\frac{11}{16}$	$\frac{5}{16}$	Webbed	1.05
B24SN	60	2.50	$\frac{5}{16}$	$\frac{11}{16}$	$\frac{5}{16}$	Webbed	1.20
B24S	66	2.75	$\frac{5}{16}$	$\frac{11}{16}$	$\frac{5}{16}$	Webbed	1.35
B24SN	72	3.00	⅜	¾	$\frac{5}{16}$	Webbed	1.50
B24SN	84	3.50	⅜	¾	$\frac{5}{16}$	Spoked	1.70
B24SN	96	4.00	⅜	¾	$\frac{5}{16}$	Spoked	1.90
B24SN	108	4.50	⅜	⅞	⅜	Spoked	2.10
B24SN	120	5.00	⅜	⅞	⅜	Spoked	2.15
B24SN	144	6.00	⅜	⅞	⅜	Spoked	2.50

Bond Finished Brass Spur Gears

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Type	List Price	Symbol	Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Type	List Price
32 Diam. Pitch—.0982" Circ. Pitch—$\frac{3}{16}$" Face															
B32S	12	.375	1/8	....	....	Plain	$ .18	B32S	44	1.375	1/4	....	....	Plain	$ .60
B32S	14	.437	1/8	....	....	Plain	.20	B32S	48	1.500	1/4	....	....	Plain	.65
B32S	15	.468	1/8	....	....	Plain	.20	B32S	52	1.625	1/4	....	....	Plain	.70
B32S	16	.500	3/16	....	....	Plain	.22	B32SN	56	1.75	5/16	....	....	Plain	.75
B32S	18	.562	3/16	....	....	Plain	.24	B32SN	64	2.00	5/16	5/8	1/4	Plain	.85
B32S	20	.625	3/16	....	....	Plain	.26	B32S	72	2.250	5/16	5/8	5/16	Webbed	1.00
B32S	22	.687	3/16	....	....	Plain	.28	B32S	80	2.50	5/16	5/8	5/16	Webbed	1.15
B32S	24	.750	3/16	....	....	Plain	.30	B32SN	96	3.00	5/16	5/8	5/16	Webbed	1.30
B32S	26	.812	3/16	....	....	Plain	.32	B32SN	112	3.50	5/16	5/8	5/16	Spoked	1.50
B32S	28	.875	3/16	....	....	Plain	.35	B32S	128	4.00	5/16	3/4	5/16	Spoked	1.70
B32S	30	.937	3/16	....	....	Plain	.40	B32S	144	4.50	5/16	3/4	5/16	Spoked	1.80
B32S	32	1.00	1/4	....	....	Plain	.45	B32SN	160	5.00	5/16	3/4	5/16	Spoked	1.90
B32S	36	1.125	1/4	....	....	Plain	.50	B32S	192	6.00	3/8	7/8	5/16	Spoked	2.25
B32S	40	1.250	1/4	....	....	Plain	.55								
48 Diam. Pitch—.0654" Circ. Pitch—1/8" Face															
B48S	12	.250	1/8	....	....	Plain	.15	B48S	44	.916	3/16	....	....	Plain	.35
B48S	14	.292	1/8	....	....	Plain	.15	B48SN	48	1.00	1/4	1/2	1/4	Plain	.40
B48S	15	.312	1/8	....	....	Plain	.18	B48SN	54	1.125	1/4	1/2	1/4	Plain	.45
B48S	16	.333	1/8	....	....	Plain	.18	B48SN	60	1.250	1/4	1/2	1/4	Plain	.50
B48S	18	.375	1/8	....	....	Plain	.18	B48SN	66	1.375	1/4	1/2	1/4	Plain	.55
B48S	20	.417	1/8	....	....	Plain	.20	B48SN	72	1.500	1/4	1/2	1/4	Plain	.60
B48SN	22	.458	5/16	....	....	Plain	.20	B48SN	84	1.750	1/4	1/2	1/4	Plain	.65
B48S	24	.500	3/16	....	....	Plain	.20	B48SN	96	2.00	1/4	1/2	1/4	Plain	.70
B48S	26	.542	3/16	....	....	Plain	.22	B48SN	100	2.083	5/16	5/8	5/16	Plain	.80
B48S	32	.666	3/16	....	....	Plain	.24	B48S	120	2.50	5/16	5/8	5/16	Webbed	1.00
B48S	36	.750	3/16	....	....	Plain	.27	B48SN	144	3.00	5/16	5/8	5/16	Webbed	1.25
B48S	40	.833	3/16	....	....	Plain	.30	B48SN	192	4.00	5/16	5/8	5/16	Spoked	1.50

Bond Bronze Worm Gears

Single cut thread. Teeth hobbed right hand.

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Pitch Dia.	Bore	Hub. Dia.	Hub. Proj.	Type	List Price	Symbol	Teeth	Pitch Dia.	Bore	Hub. Dia.	Hub. Proj.	Type	List Price
16 Diam. Pitch—.1963" Circ. Pitch—$\frac{5}{16}$" Concave Face															
B16GA	20	1.25	1/4	5/8	3/8	Plain	$1.00	B16GA	48	3.00	3/8	7/8	3/8	Spoked	$1.85
B16GA	24	1.50	1/4	5/8	3/8	Plain	1.10	B16GA	64	4.00	3/8	1	7/16	Spoked	2.25
B16GAN	28	1.75	5/16	5/8	3/8	Plain	1.20	B16GA	80	5.00	3/8	1	7/16	Spoked	2.50
B16GA	32	2.00	5/16	3/4	3/8	Plain	1.30	B16GA	96	6.00	3/8	1	7/16	Spoked	3.40
B16GA	40	2.50	5/16	3/4	3/8	Plain	1.50								
24 Diam. Pitch—.1309" Circ. Pitch—1/4" Concave Face															
B24GA	24	1.00	3/16	5/8	5/16	Plain	.80	B24GA	48	2.00	1/4	5/8	5/16	Plain	1.25
B24GA	30	1.25	3/16	5/8	5/16	Plain	.90	B24GA	60	2.50	5/16	3/4	3/8	Plain	1.50
B24GA	36	1.50	3/16	5/8	5/16	Plain	1.00	B24GA	72	3.00	5/16	3/4	3/8	Spoked	1.75
B24GA	42	1.75	3/16	5/8	5/16	Plain	1.15	B24GA	96	4.00	3/8	7/8	7/16	Spoked	2.25
32 Diam. Pitch—.0982" Circ. Pitch—$\frac{7}{32}$" Concave Face															
B32GA	24	.75	3/16	1/2	1/4	Plain	.70	B32GA	64	2.00	1/4	5/8	5/16	Plain	1.40
B32GA	32	1.00	3/16	1/2	1/4	Plain	.90	B32GA	80	2.50	5/16	3/4	3/8	Plain	1.50
B32GA	40	1.25	1/4	5/8	5/16	Plain	1.00	B32GA	96	3.00	5/16	3/4	3/8	Spoked	1.75
B32GA	48	1.50	1/4	5/8	5/16	Plain	1.15								
48 Diam. Pitch—.0654" Circ. Pitch—$\frac{5}{32}$" Concave Face															
B48GA	24	.50	3/16	3/8	1/4	Plain	.40	B48GA	48	1.00	3/16	1/2	1/4	Plain	.75
B48GA	30	.625	3/16	7/16	1/4	Plain	.50	B48GA	72	1.50	5/16	5/8	5/16	Plain	1.00
B48GA	36	.75	3/16	7/16	1/4	Plain	.60	B48GA	96	2.00	1/4	5/8	5/16	Plain	1.35

Brass Worms

Single Thread—Right Hand.

In ordering state Symbol Only.

Symbol	Teeth	Pitch Diam.	Circ. Pitch	Face	Bore	Hub	List Price	Symbol	Teeth	Pitch Diam.	Circ. Pitch	Face	Bore	Hub	List Price
B16WA	16	.625	.1963	3/4	1/4	No	$ .65	B32WA	32	.4375	.0982	1/2	3/16	No	$ .40
B24WA	24	.500	.1309	5/8	3/16	No	.55	B48WA	48	.333	.0654	7/16	3/16	No	.35

Steel Worms

Single Thread—Right Hand.

Symbol	Teeth	Pitch Diam.	Circ. Pitch	Soft or Hard	Face	Bore	Hub Dia.	Hub Proj.	List Price	Symbol	Teeth	Pitch Diam.	Circ. Pitch	Soft or Hard	Face	Bore	Hub Dia.	Hub Proj.	List Price
S16WA	16	.625	.1963	Soft	3/4	1/4	No	No	$ .65	S32WA	32	.4375	.0982	Soft	1/2	3/16	No	No	$ .40
S16WAJN	16	.625	.1963	Soft	1	5/16	.46	1/4	.90	S32WAHN	32	.4375	.0982	Hard	1/2	3/16	.35	3/16	1.10
S16WAYN	16	.625	.1963	Hard	1	5/16	.46	1/4	1.65										
S24WA	24	.500	.1309	Soft	5/8	3/16	No	No	.55	S48WA	48	.333	.0654	Soft	7/16	3/16	No	No	.35
S24WAJN	24	.500	.1309	Soft	7/8	1/4	.38	1/4	.75	S48WAHN	48	.333	.0654	Hard	7/16	3/16	.25	3/16	1.00
S24WAYN	24	.500	.1309	Hard	7/8	1/4	.38	1/4	1.50										

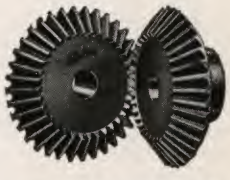
Bond Cut Bevel Gears—Iron, Steel and Brass

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Material	Pitch Dia.	Face	Bore	Backing	Hub Dia.	Lgth. thru Hub	Price Each
16 Diameter Pitch									
S16 4B	24	Steel	1.5	1/4	1/2	5/8	1	5/8	$1.30
S16 4BN	12	Steel	.75	1/4	1/4	3/8	5/8	9/16	.80
S16 4B	24	Steel	1.5	1/4	1/2	5/8	1	5/8	1.30
S16 4BNZ	12	Steel	.75	1/4	3/8	3/8	5/8	9/16	.80
S16 4B	32	Steel	2.	3/8	1/2	3/4	1 1/4	13/16	1.45
S16 4B	16	Steel	1.	3/8	3/8	7/16	3/4	3/4	.90
R16 6BN	48	Iron	3.	7/16	1/2	7/8	1 1/2	7/8	2.00
S16 6BN	16	Steel	1.	7/16	3/8	7/16	7/8	13/16	1.00
R16 6BNZ	48	Iron	3.	7/16	5/8	7/8	1 1/2	7/8	2.00
S16 6BNZ	16	Steel	1.	7/16	7/16	7/16	7/8	13/16	1.00
R16 8BN	64	Iron	4.	1/2	5/8	7/8	1 1/2	7/8	2.75
S16 8BN	16	Steel	1.	1/2	1/2	7/16	13/16	7/8	1.25
20 Diameter Pitch									
S20 4B	20	Steel	1.	3/16	3/8	3/8	3/4	3/8	1.20
S20 4B	10	Steel	.5	3/16	3/16	1/4	13/32	25/64	.60
S20 6B	30	Steel	1.5	1/4	3/8	7/16	1	7/16	1.80
S20 6B	10	Steel	.5	1/4	3/16	1/4	13/32	15/32	1.00

Symbol	Teeth	Material	Pitch Dia.	Face	Bore	Backing	Hub Dia.	Lgth. thru Hub	Price Per Pair
24 Diameter Pitch									
B24 4BN	36	Brass	1.5	1/4	1/4	13/32	11/16	31/64	
B24 4BN	18	Brass	.75	1/4	3/16	5/16	9/16	33/64	$1.25
B24 4BN	48	Brass	2.	9/32	5/16	7/16	5/8	1/2	
B24 4BN	24	Brass	1.	9/32	1/4	3/8	11/16	19/32	2.00
B24 6B	54	Brass	2.25	9/32	3/8	9/16	1 1/4	9/16	
B24 6B	18	Brass	.75	9/32	3/16	5/16	1 1/2	17/32	1.90
32 Diameter Pitch									
B32 4BN	32	Brass	1.	5/32	3/16	11/32	9/16	3/8	
B32 4BN	16	Brass	.5	5/32	3/16	7/32	3/8	11/32	1.00
B32 8BN	64	Brass	2.	1/4	5/16	7/16	11/16	3/8	
B32 8BN	16	Brass	.5	1/4	3/16	1/4	3/8	31/64	1.65
48 Diameter Pitch									
B48 4BN	36	Brass	.75	1/8	3/16	1/4	7/16	1/4	
B48 4BN	18	Brass	.375	1/8	1/8	7/32	9/32	19/64	.95
B48 6BN	36	Brass	.75	3/32	3/16	1/4	7/16	17/64	
B48 6BN	12	Brass	.25	3/32	1/8	3/16	7/32	1/4	.90

NOTE: Bevel gears are not interchangeable but must run in pairs as listed above.



Bond Cut Miter Gears

IRON, STEEL AND BRASS

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Material	Pitch Dia.	Face	Bore	Backing	Hub Dia.	Lgth. thru Hub	List Price Pair
6 Diameter Pitch									
S6M	24	Steel	4.	1 1/8	1 3/16	1 3/8	2 3/4	2	$10.00
R6M	30	Iron	5.	1 1/4	1	1 3/4	2 1/2	2 1/2	8.65
R6MN	36	Iron	6.	1 1/4	1 1/8	1 3/4	2 3/4	2 1/2	11.00
8 Diameter Pitch									
S8M	24	Steel	3.	3/4	3/4	1 1/8	2	1 1/2	5.00
R8M	24	Iron	3.	3/4	7/8	1 1/8	2 1/4	1 1/2	4.50
S8M	28	Steel	3.5	7/8	1	1 1/4	2 1/2	1 3/4	8.50
R8MN	28	Iron	3.5	7/8	3/4	1 1/4	2 1/4	1 3/4	5.00
S8M	32	Steel	4.	7/8	1	1 1/4	2 1/2	1 3/4	10.50
R8MN	32	Iron	4.	7/8	3/4	1 1/4	2 1/4	1 3/4	6.50
10 Diameter Pitch									
S10MN	20	Steel	2.	9/16	1/2	1	1 5/8	1 5/16	3.00
S10MNZ	20	Steel	2.	9/16	3/4	1	1 5/8	1 5/16	3.00
S10MN	25	Steel	2.5	11/16	3/4	1 3/16	2	1 37/64	4.20
S10MN	30	Steel	3.	11/16	7/8	1 3/16	2	1 9/16	5.00
12 Diameter Pitch									
S12MN	15	Steel	1.25	5/16	1/2	5/8	1	25/32	1.75
S12M	18	Steel	1.5	3/8	1/2	5/8	1 1/4	13/16	2.10
S12MZ	18	Steel	1.5	3/8	5/8	5/8	1 1/4	13/16	2.10
S12M	21	Steel	1.75	3/8	1/2	11/16	1 3/8	7/8	2.25
S12M	24	Steel	2.	1/2	1/2	3/4	1 1/2	1	2.60
S12M	30	Steel	2.5	5/8	1/2	7/8	1 3/4	1 1/4	3.75
S12MZ	30	Steel	2.5	5/8	5/8	7/8	1 3/4	1 1/4	3.75

Symbol	Teeth	Material	Pitch Dia.	Face	Bore	Backing	Hub Dia.	Lgth. thru Hub	List Price Pair
14 Diameter Pitch									
S14M	14	Steel	1.	1/4	3/8	1/2	7/8	5/8	$1.60
S14MZ	14	Steel	1.	1/4	7/16	1/2	7/8	5/8	1.60
S14M	21	Steel	1.5	3/8	3/8	5/8	1	25/32	2.00
S14M	28	Steel	2.	7/16	1/2	3/4	1 1/4	1	2.25
16 Diameter Pitch									
S16M	12	Steel	.75	3/16	1/4	7/16	5/8	17/32	1.30
S16MZ	12	Steel	.75	3/16	5/16	7/16	5/8	17/32	1.30
S16MN	16	Steel	1.	1/4	3/8	1/2	3/4	5/8	1.50
S16MN	20	Steel	1.25	5/16	7/16	5/8	1	25/32	1.70
S16MN	24	Steel	1.5	5/16	1/2	5/8	1 1/8	25/32	1.95
20 Diameter Pitch									
S20MN	15	Steel	.75	5/32	5/16	3/8	5/8	7/16	1.25
S20MN	20	Steel	1.	3/16	3/8	3/8	3/4	7/16	1.45
24 Diameter Pitch									
B24MN	24	Brass	1.	7/32	1/4	13/32	5/8	17/32	1.10
B24MN	30	Brass	1.25	1/4	1/4	13/32	5/8	35/64	1.40
B24MN	36	Brass	1.5	1/4	5/16	7/16	11/16	37/64	1.85
32 Diameter Pitch									
B32MN	16	Brass	.5	1/8	3/16	1/4	13/32	21/64	.70
B32MN	24	Brass	.75	5/32	3/16	5/16	1/2	25/64	.90
B32M	32	Brass	1.	3/16	3/16	5/16	3/4	3/8	1.50
48 Diameter Pitch									
B48MN	15	Brass	.3125	3/32	1/8	5/32	1/4	7/32	.60
B48MN	18	Brass	.375	7/64	1/8	7/32	5/16	17/64	.60

Bond Cut Bronze Sprockets

In ordering state Symbol and Number of Teeth.

Symbol	Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Type	List Price
For No. 1 Chain—1/12" Face							
B1X	6	.36	1/8	1/4	1/4	Plain	$ .30
B1X	8	.47	1/8	5/16	1/4	Plain	.35
B1X	10	.59	1/8	3/8	1/4	Plain	.40
B1X	12	.70	3/16	7/16	1/4	Plain	.45
B1X	15	.87	3/16	9/16	1/4	Plain	.55
For No. 2 Chain—1/8" Face							
B2X	6	.57	3/16	11/32	1/4	Plain	.40
B2X	8	.75	3/16	1/2	1/4	Plain	.45
B2X	9	.83	3/16	1/2	1/4	Plain	.50
B2X	10	.92	3/16	1/2	1/4	Plain	.55
B2X	11	1.01	3/16	1/2	1/4	Plain	.60
B2X	12	1.10	3/16	1/2	1/4	Plain	.65
B2X	14	1.28	1/4	5/8	5/16	Plain	.70
B2X	16	1.46	1/4	5/8	5/16	Plain	.80
For No. 3 Chain—3/32" Face							
B3X	5	.59	3/16	5/16	1/4	Plain	.45
B3X	6	.70	3/16	7/16	1/4	Plain	.50
B3X	7	.80	3/16	1/2	1/4	Plain	.55
B3X	8	.91	3/16	1/2	1/4	Plain	.65
B3X	9	1.02	3/16	9/16	5/16	Plain	.75
B3X	10	1.13	3/16	9/16	5/16	Plain	.85
B3X	12	1.35	1/4	5/8	5/16	Webbed	.95
B3X	16	1.78	1/4	5/8	5/16	Webbed	1.05
For No. 4 Chain—5/32" Face							
B4X	5	.59	3/16	5/16	1/4	Plain	.45
B4X	6	.70	3/16	7/16	1/4	Plain	.50
B4X	7	.80	3/16	1/2	1/4	Plain	.55
B4X	8	.91	3/16	1/2	1/4	Plain	.65
B4X	9	1.02	3/16	9/16	5/16	Plain	.75
B4X	10	1.13	3/16	9/16	5/16	Plain	.85
B4X	12	1.35	1/4	5/8	5/16	Webbed	.95
B4X	16	1.78	1/4	5/8	5/16	Webbed	1.05

Symbol	Teeth	Pitch Dia.	Bore	Hub Dia.	Hub Proj.	Type	List Price
B1X	18	1.04	3/16	9/16	1/4	Plain	$ .65
B1X	20	1.16	3/16	9/16	1/4	Plain	.70
B1X	24	1.39	3/16	5/8	5/16	Plain	.95
B1X	32	1.85	1/4	5/8	5/16	Plain	1.10
B2X	18	1.64	1/4	5/8	5/16	Plain	.90
B2X	20	1.82	1/4	5/8	5/16	Plain	1.00
B2X	21	1.91	5/16	3/4	3/8	Plain	1.10
B2X	24	2.18	5/16	3/4	3/8	Plain	1.20
B2X	27	2.46	5/16	3/4	3/8	Plain	1.30
B2X	32	2.91	5/16	3/4	3/8	Spoked	1.50
B2X	44	4.00	3/8	3/4	3/8	Spoked	1.75
B3X	20	2.22	5/16	3/4	3/8	Webbed	1.20
B3X	22	2.45	5/16	3/4	3/8	Webbed	1.40
B3X	24	2.66	5/16	3/4	3/8	Webbed	1.60
B3X	27	3.00	5/16	3/4	3/8	Spoked	1.80
B3X	36	3.99	3/8	7/8	7/16	Spoked	2.00
B3X	45	4.99	3/8	7/8	7/16	Spoked	2.20
B3X	54	5.99	3/8	7/8	7/16	Spoked	2.40
B4X	20	2.22	5/16	3/4	3/8	Webbed	1.20
B4X	22	2.45	5/16	3/4	3/8	Webbed	1.40
B4X	24	2.66	5/16	3/4	3/8	Webbed	1.60
B4X	27	3.00	5/16	3/4	3/8	Spoked	1.80
B4X	36	3.99	3/8	7/8	7/16	Spoked	2.00
B4X	45	4.99	3/8	7/8	7/16	Spoked	2.20
B4X	54	5.99	3/8	7/8	7/16	Spoked	2.40

Brass Chain

No.	Width Inch	Tensil Strength	Links per Foot	Price per Foot
1	3/32	20 Lbs.	65	$ .10
2	5/32	43 Lbs.	42	.10
3	3/16	33 Lbs.	34	.15
4	3/16	78 Lbs.	34	.30

Steel Chain

No.	Width Inch	Tensil Strength	Links per Foot	Price per Foot
1	3/32	30 Lbs.	65	$ .10
2	5/32	46 Lbs.	42	.10
3	3/16	64 Lbs.	34	.15
4	3/16	166 Lbs.	34	.20

High Tensil Steel Chain

No.	Width Inch	Tensil Strength	Links per Foot	Price per Foot
1	3/32	51 Lbs.	65	$ .15
2	5/32	100 Lbs.	42	.15
3	3/16	100 Lbs.	34	.20

Ask for complete Bond Gear Catalogue.

WE ARE CONSTANTLY ADDING NEW ITEMS TO OUR STOCK

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INFORMATION SECTION

Table of Contents

Density or Specific Gravity of Metals and Alloys

Material	Specific Gravity	Wt. in Lbs. Cu. Ft.	Wt. in Lbs. Cu. In.	Cu. In. in One Lb.
Aluminum				
Cast	2.569	160.	.093	10.80
Wrought	2.681	167.	.097	10.35
Bronze	7.787	485.	.281	3.56
Antimony	6.712	418.	.242	4.13
Arsenic	5.748	358.	.207	4.83
Bismuth	9.827	612.	.354	2.82
Benedict nickel	8.691	542.6	.3140	3.19
Brass				
Cast	7.868	490.	.284	3.53
	8.430	525.	.304	3.29
	8.109	505.	.292	3.42
Muntz—metal	8.221	512.	.296	3.37
Naval (rolled)	8.510	530.	.307	3.26
Rods	8.509	531.2	.3074	3.25
Sheet	8.469	528.7	.3060	3.27
Cartridge	8.465	529.7	.3066	3.26
Tubes, brazed	8.597	536.7	.3106	3.21
Tubes, seamless	8.495	530.3	.3069	3.26
Wire	8.437	526.7	.3048	3.28
Bronze				
Gun-metal	8.478	528.	.306	3.27
	8.863	552.	.319	3.13
	8.735	544.	.315	3.18
Phosphor, wire	8.881	554.4	.3208	3.11
Tobin, rods	8.404	524.6	.3036	3.29
Tobin, sheet	8.404	524.6	.3036	3.29
Copper				
Cast	8.622	537.	.311	3.22
Drawn bars	8.900	555.6	.3215	3.11
Hammered	8.927	556.	.322	3.11
Rods	8.900	555.6	.3215	3.11
Sheet	8.900	555.6	.3215	3.11
Tubes, seamless	8.932	557.6	.3227	3.09
Wire	8.900	555.6	.3215	3.11
Gold (pure)	19.316	1203.	.696	1.44
Standard 22 carat fine	17.502	1090.	.631	1.59
Iron—cast	6.904	430.	.249	4.02
	7.386	499.	.266	3.76
	7.209	464.	.260	3.85
Iron—wrought	7.547	470.	.272	3.56
	7.803	486.	.281	3.68
	7.707	480.	.278	3.60
Lead—cast	11.368	708.	.410	2.44
Lead—sheet	11.432	712.	.412	2.43
Manganese	8.012	499.	.289	2.46
Nickel—cast	8.285	516.	.299	3.35
Nickel—rolled	8.687	541.	.313	3.19
Nickel Silver				
Sheet 18% Grade "A"	8.752	546.4	.3162	3.16
Wire 18%	8.680	541.9	.3136	3.18
Resistance wire 30%	8.740	545.6	.3158	3.16
Platinum	21.516	1340.	.775	1.29
Silver	10.517	655.	.379	2.64
Steel	7.820	487.	.282	3.55
	7.916	493.	.285	3.51
	7.868	490.	.284	3.53
Tin	7.418	462.	.267	3.74
White metal (Babbitt's)	7.322	456.	.264	3.79
Zinc—cast	6.872	428.	.248	4.05
Zinc—sheet	7.209	449.	.260	3.84

SPECIFIC GRAVITY

The specific gravity of a body is the ratio between its weight and the weight of a like volume of distilled water at a temperature of 39.2 degrees F. To find the weight of a cubic foot of any liquid or solid, multiply its specific gravity by 62.425 pounds avoirdupois, the weight of a cubic foot of water.

Tensile Strength of Materials

Pounds Per Square Inch

METAL	Pounds
Aluminum—Castings	15000
Sheet	24000
Bars	28000
Antimony—Cast	1000
Bismuth—Cast	3200
Brass—Cast (18000 to 29000)	23500
Sheet—Soft (35000 to 46000)	44670
Hard (64000 to 86000)	79300
Wire—Annealed	49000
Hard	80000
Bronze—Cast	45000
Wire, annealed (phosphor)	63000
Wire, hard	150000
Delta metal, cast	44800
Delta metal, rolled	67200
Gun metal (copper and tin—23000 to 55000)	39000
Manganese, cast	80000
Manganese, rolled	75000
Tobin, rods	60000 to 80000
Naval, rolled	65000
Copper—Cast (18000 to 30000)	24000
Rods	33000
Sheet	30000
Wire, annealed	32000
Wire, hard	60000
Gold—Cast	20000
Wire	27500
Iron—Cast	18000
Cast malleable	28000
Cast malleable, annealed	46000
Wrought	45000
Lead—Cast	1800
Rolled sheet	3300
Wire	1500
Platinum—Wire, annealed	32000
Wire, hard	56000
Silver—Cast	40000
Steel—Cast	60000 to 80000
Forgings	60000 to 95000
Tin—Cast	3360
Block	4500
Wire	70000
Zinc—Cast	3360
Sheet	15680

WOODS	
Ash	11000 to 17000
Beech	11500 to 18000
Cedar	10300 to 11400
Chestnut	10500
Elm	13000 to 13489
Hemlock	8700
Hickory	12800 to 18000
Locust	20500 to 24800
Maple	10500 to 10584
Oak—white	10253 to 19500
Pine—white	10000 to 12000
Pine—yellow	12600 to 19200
Spruce	10000 to 19500
Walnut—black	9286 to 16000

Weight of Stones, Earth, Etc.

Weight in Pounds of one cubic foot

Material	Pounds	Material	Pounds
Asphaltum	64-112	Grindstone	134
Brick, common	100-125	Lime, quick	52
Brick, fire	137-150	Limestone and marbles	150-179
Cement, Portland	80- 90	Mortar, hardened	88-118
Clay	120	Mud, dry and close	80-110
Concrete	120-140	Mud, wet and fluid	104-120
Earth	77-120	Sand, dry	88-110
Glass, crown	156	Sand, wet	118-129
Glass, flint	187	Sandstone	130-170
Glass, plate	169	Victoriastone (crushed granite, Portland cement, silica)	144
Granite	164-175		
Gravel	90-125		

S. A. E. Specifications for Brass, Bronze & Copper Alloys

Taken from S. A. E. Handbook, 1936 Edition

S.A.E. No.	Description	Composition in Percentages Copper	Tin	Lead	Zinc	Iron	Nickel	Phosphorus	Aluminum	Sulphur	Antimony	Manganese	Other Impurities Maximum
										Max.	Max.		
40	Red Brass—Castings	84. to 86.	4. to 6.	4. to 6.	4. to 6.	Max. .25	Max. .75	Max. .05	.....	.05	.25	.....	.15
									Max.	Max.	Max.		
41	Yellow Brass—Castings	62. to 67.	Max. 1.	1.5 to 3.5	Remainder	Max. .75	Max. .25	Max. .03	.3	.05	.15	.....	.15
42	White Nickel Brass—Castings	55. to 64.	.....	.....	Remainder	Max. .35	Min. 18.	.....	.....	.....	.....	.....	.25
									Max.			Max.	
43	Manganese Bronze—Castings	55. to 60.	Max. 1.5	Max. .4	38. to 42.	Max. 2.	.....	.....	1.5	.....	.....	1.5	.....
44	Cast Brass to be Brazed	83. to 86.	.....	Max. .5	14. to 17.	Max. .15	.....	.....	.....	.....	.....	.....	.....
45	Brazing Solder	48. to 52.	.....	Max. .5	Remainder	Max. .1	.....	.....	.....	.....	.....	.....	.....
62	Hard Bronze Castings	86. to 89.	9. to 11.	Max. .20	1. to 3.	Max. .06	.....	.....	.....	.....	.....	.....	.....
63	Leaded Gun Metal Castings	86. to 89.	9. to 11.	1. to 2.5	.....	.....	.....	Max. .25	.....	.....	.....	.....	.5
64	Phosphor Bronze Castings	78.5 to 81.5	9. to 11.	9. to 11.	Max. .75	.....	.....	.05 to .25	.....	.....	.....	.....	.25
											Max.		
640	Nickel Phosphor Bronze Castings	85.25 to 87.75	10. to 12.	1. to 1.5	.....	Max. .3	.75 to 1.25	.2 to .3	.....	.....	.20	.....	.10
65	Phosphor Gear Bronze Castings	88. to 90.	10. to 12.	.....	.....	.....	.....	.1 to .3	.....	.....	.....	.....	.5
66	Bronze Backing for Lined Bearings	83. to 86.	4.5 to 6.	8. to 10.	Max. 2.	.....	.....	.....	.....	.....	.....	.....	.25
											Max.		
660	Bronze Bearing Castings	81. to 85.	6.5 to 7.5	6. to 8.	2. to 4.	Max. .20	.....	.....	.....	.....	.20	.....	.50
											Max.		
67	Semi-Plastic Bronze Castings	76.5 to 79.5	5. to 7.	14.5 to 17.5	Max. 4.	Max. .4	.....	.....	.....	.....	.4	.....	1.
									7. to				
68	Cast Aluminum Bronze—Type A	87. to 89.	Max. .5	.....	.....	2.5 to 4.	.....	.....	9.	.....	.....	.....	1.
									9.5 to				
	Type B	89.5 to 90.5	Max. .2	.....	.....	Max. 1.	.....	.....	10.5	.....	.....	.....	.5
70	Commercial Brass Sheets—Type A	68.5 to 71.5	.....	Max. .07	Remainder	Max. .04	.....	.....	.....	.....	.....	.....	.....
	Type B	66. to 69.	.....	Max. .07	Remainder	Max. .04	.....	.....	.....	.....	.....	.....	.....
	Type C	64.5 to 67.5	.....	Max. .35	Remainder	Max. .06	.....	.....	.....	.....	.....	.....	.....
71	Copper Sheets	Min. 99.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
72	Free Cutting Brass Rods	60. to 63.	.....	2.5 to 3.75	Remainder	Max. .15	.....	.....	.....	.....	.....	.....	.5
73	Naval Brass or Tobin Bronze Rods	59. to 62.	.5 to 1.5	Max .3	Remainder	Max. .1	.....	.....	.....	.....	.....	.....	.1
74	Seamless Tubing—Muntz Metal	59. to 63.	Max. .15	Max. .5	Remainder	Max. .07	.....	.....	.....	.....	.....	.....	.....
	High Brass	65. to 68.	Max. .15	Max. .8	Remainder	Max. .07	.....	.....	.....	.....	.....	.....	.....
	Red Brass	84. to 87.	Max. .15	Max. .07	Remainder	Max. .07	.....	.....	.....	.....	.....	.....	.....
75	Copper Tubing	Min. 99.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
76	Naval Brass or Tobin Bronze Tubing	59. to 61.	.5 to 1.	Max. .3	Remainder	Max. .1	.....	.....	.....	.....	.....	.....	.1
77	Phosphor Bronze Strips—Type A	Remainder	4. to 6.	Max. .1	Max. .2	Max. .1	.....	.03 to .4	.....	.....	.....	.....	.....
	Type B	Remainder	7. to 9.	Max. .1	Max. .2	Max. .1	.....	.03 to .2	.....	.....	.....	.....	.....
79	Red Brass Sheets—Type A	83. to 86.	.....	Max. .15	Remainder	Max. .06	.....	.....	.....	.....	.....	.....	.1
	Type B	79. to 82.	.....	Max. .20	Remainder	Max. .05	.....	.....	.....	.....	.....	.....	.1
80	Brass Wire—Type A	70. to 74.	.....	Max. .1	Remainder	Max. .06	.....	.....	.....	.....	.....	.....	.....
	Type B	64. to 68.	.....	Max. .1	Remainder	Max. .07	.....	.....	.....	.....	.....	.....	.....
81	Phosphor Bronze Wire	Remainder	4. to 6.	Max. .1	Max. .2	Max. .1	.....	.03 to .4	.....	.....	.....	.....	.....
82	Brass Wire	59. to 62.	.....	Max. .3	Remainder	Max. .06	.....	.....	.....	.....	.....	.....	.....
83	Soft or Annealed Copper Wire	—Upon application.											
88	Brass Rods	58.5 to 61.5	.....	1.5 to 2.5	Remainder	Max. .15	.....	.....	.....	.....	.....	.....	.35

No attempt has been made to show the mechanical requirements or other general information. This may be had upon application.

It is recommended that users of these specifications check back to the Society of Automotive Engineers, Inc., 29 West 39th St., New York City, for information as to any modifications that may have been subsequently adopted in these specifications.

Chemical and Physical Properties

COPPER AND COPPER ALLOYS

Variations from these figures must be expected in practice. These values cannot be obtained in all size specifications due to limitations of manufacture. Full technical information applying to particular specifications can be obtained upon request.

Material	Shape	Average Composition—Percent Copper	Zinc	Lead	Tin	Tensil Strength Lbs. Per Sq. In. Hard	Soft	Elongation Per Cent In 2 In. Hard	Soft	Yield Point Lbs. Per Sq. In. Hard	Soft	Rockwell Hardness No. 1/16" Ball, 100 Kg. Hard	Soft	Melting Point Deg. Fahr.	Density Pounds Per Cu. In.
Copper	Rod	99.90	.....	.....	.....	50,000	32,000	18	38	46,000	15,000	....	....	1981	0.322
	Sheet	99.90	.....	.....	.....	51,000	32,500	4	37	48,000	12,000	58	Too Soft	1981	0.322
	Wire	99.90	.....	.....	.....	60,000	38,000	3(c)	36(c)	39,000	.....	....	....	1981	0.322
Deoxidized Copper (Phosphorus Present)	Rod	99.90	.....	.....	.....	58,000	35,000	5	38	.....	15,000	....	....	1981	0.323
	Sheet	99.90	.....	.....	.....	55,000	35,000	5	35	44,000	16,000	61	....	1981	0.323
	Tube	99.90	.....	.....	.....	50,000	35,000	10	35	48,000	.....	58	Too Soft	1981	0.323
	Wire	99.90	.....	.....	.....	60,000	35,000	2.6(c)	35(c)	.....	.....	....	....	1981	0.323
Commercial Bronze 90%	Sheet	90.00	10.00	.....	.....	67,000	37,000	3	40	53,000	11,000	75	1	1913	0.318
Commercial Bronze 95%	Sheet	95.00	5.00	.....	.....	55,000	35,000	5	38	39,000	11,000	68	....	1949	0.320
Red Brass 80%	Sheet	80.00	20.00	.....	.....	85,000	43,000	4	50	.....	.....	86	11	1832	0.313
	Wire	80.00	20.00	.....	.....	125,000	49,000	2(c)	43(c)	.....	.....	....	....	1832	0.313
Red Brass 85%	Sheet	85.00	15.00	.....	.....	75,000	42,000	4	43	71,000	18,000	82	10	1868	0.316
	Tube	85.00	15.00	.....	.....	68,000	42,000	6	42	64,000	19,000	....	....	1868	0.316
Spring Brass	Sheet	72.00	28.00	.....	.....	76,000	47,000	4	55	38,000	.....	88	20	1769	0.309
Spinning (Drawing) Brass	Sheet	66.67	33.33	.....	.....	76,000	46,000	5	52	.....	.....	86	20	1720	0.306
Yellow Brass	Rod	65.00	35.00	.....	.....	70,000	45,000	15	50	.....	12,500	....	....	1706	0.306
	Sheet	65.00	35.00	.....	.....	76,000	45,000	5	60	.....	.....	85	30	1706	0.306
Yellow Brass	Rod	63.00	37.00	.....	.....	70,000	50,000	12	50	.....	.....	....	....	1688	0.305
	Sheet	63.00	37.00	.....	.....	84,000	48,000	4	50	.....	.....	....	....	1688	0.305
	Wire	63.00	37.00	.....	.....	125,000	50,000	2(c)	50(c)	.....	.....	....	....	1688	0.305
Yellow Brass	Tube	67.50	32.00	0.50	.....	50,000	44,000	5	45	.....	17,000	....	....	.....	0.307
Yellow Brass—Free Cutting	Rod	62.00	35.00	3.00	.....	62,000	47,000	20	60	52,000	32,000	77	16	1625	0.307
Leaded Brass	Rod	69.00	29.50	1.50	.....	84,000	45,000	3	34	33,000	.....	....	....	.....	0.309
Leaded Commercial Bronze	Rod	88.50	10.00	1.50	.....	60,000	35,000	3	30	.....	.....	58	....	.....	0.319
Admiralty Metal	Sheet	70.00	29.00	.....	1.00	95,000	45,000	5	60	.....	.....	.....	....	1715	0.308
	Tube	70.00	29.00	.....	1.00	.....	55,000	....	60	.....	.....	.....	....	1715	0.308
Muntz Metal	Sheet	60.00	40.00	.....	.....	80,000	57,000	9.5	48	.....	20,000	87	42	1661	0.303
Naval Brass	Rod	60.00	39.25	.....	0.75	62,000	54,000	25	40	.....	.....	....	....	1625	0.304
Tobin Bronze	Rod	60.00	39.25	.....	0.75	75,000	54,000	25	50	60,000	25,000	75	....	1625	0.304
	Sheet	60.00	39.25	.....	0.75	90,000	54,000	4	40	.....	25,000	93	55	1625	0.304
	Sheet	96.00	.....	.....	3.75	90,000	45,000	4	50	.....	18,300	90	30	1922	0.320
Phosphor Bronze (Phosphorus Present)	Sheet	95.00	.....	.....	5.00	100,000	50,000	3	55	87,000	23,000	96	30	1922	0.320
	Sheet	92.00	.....	.....	8.00	110,000	55,000	3	70	85,000	25,000	99	38	1877	0.318
	Rod	94.00	.....	1.00	5.00	.....	50,000		40	.....	20,000	....	....	.....	0.322
	Sheet	89.50	.....	.....	10.50	115,000	60,000	5	65	95,000	40,000	100	52	1832	0.317
Nickel															
Cupro Nickel 20%	Sheet	80.00	.....	20.00	.....	85,000	50,000	2	30	.....	.....	85	37.5	2192	0.323
15%	Sheet	85.00	.....	15.00	.....	70,000	45,000	3	30	51,000	.....	....	....	2147	0.323
25%	Sheet	55.00	20.00	25.00	.....	110,000	72,000	4	30	.....	.....	....	60	2075	0.315
Nickel Silver 18%	Sheet	65.00	17.00	18.00	.....	90,000	58,000	3	40	83,000	.....	91	40	2030	0.316
Nickel Silver 18%	Sheet	55.00	27.00	18.00	.....	100,000	60,000	2	40	.....	.....	95	40	1931	0.314
Nickel Silver 15%	Sheet	64.00	21.00	15.00	.....	93,000	58,000	5.5	40	.....	.....	92	33	1967	0.314
Nickel Silver 15%	Sheet	57.00	28.00	15.00	.....	95,000	55,000	2	35	.....	.....	....	....	1886	0.312
Lead															
Leaded 10%	Sheet	61.00	25.00	12.50	1.50	90,000	.....	5	....	.....	.....	88	....	.....	.....
10%	Sheet	65.00	25.00	10.00	.....	90,000	50,000	3	45	.....	11,000	82	32	1850	0.313
18%	Wire	56.00	26.00	18.00	.....	143,000	60,000	1(c)	40(c)	.....	.....	....	....	.....	0.314
5%	Wire	63.00	32.00	5.00	.....	135,000	.....	2(c)	....	.....	.....	....	....	1760	.....
Manganese Tin Iron															
Manganese Bronze	Rod	57.00	40.00	0.10	1.45 1.45	90,000	65,000	15	45	.....	.....	....	....	.....	.....
	Rod	59.00	39.00	0.50	0.70 0.80	85,000	60,000	20	45	.....	.....	90	....	.....	0.302
Beryllium Nickel															
Beryllium Copper	Sheet	97.75	2.25	.....		118,000	70,000	4.3	45	105,000	31,000	102	65-73	1751	{ 0.297
	Sheet	97.40	2.25	0.35		193,000(a)	175,000(b)	2.0(a)	6.3(b)	138,000(a)	134,000(b)	114(a)	112.5(b)	.....	{ +or—.01

Silicon Bronze Alloys—Listed by Manufacturer's Trade Names.

		Copper	Silicon	Tin	Iron										
Duronze I	Rod	97.00	1.00	2.00	.....	90,000	43,000	5	40	55,000	10,000	85	30	1904	0.3172
Duronze II	Rod	96.90	3.00	.....	0.10	95,000	52,000	5	40	60,000	18,000	90	40	1796	0.3085
Manganese															
Everdur	Rod	98.25	1.50	.....	0.25	70,000	40,000	6	60	.....	10,000	....	....	1931	0.316
Everdur	Rod	96.00	3.00	.....	1.00	95,000	55,000	15	85	75,000	20,000	....	....	1866	0.308

a—Cold worked and heat treated. b—Annealed, quenched and heat treated. c—Elongation of wire, percent in ten inches.

Approximate Weights of

Brass, Copper and Tobin Bronze Rods

Pounds Per Lineal Foot

Diam. Inch	BRASS Round	Square	Hexagon	Diam. Inch	COPPER Round	Square	Hexagon	Diam. Inch	TOBIN BRONZE Round	Square	Hexagon
1/32	.002835	.0036	.003126	1/32	.0029	.0037	.0032	1/32	.0027	.0035	.0030
1/16	.01132	.0144	.01248	1/16	.0118	.0150	.0130	1/16	.0111	.0142	.0123
3/32	.02546	.0324	.02807	3/32	.0266	.0338	.0293	3/32	.0251	.0319	.0277
1/8	.04527	.0576	.04992	1/8	.0473	.0602	.0522	1/8	.0447	.0569	.0493
5/32	.07068	.0900	.07794	5/32	.0740	.0942	.0815	5/32	.0698	.0887	.0770
3/16	.1019	.1297	.1123	3/16	.1065	.1356	.1175	3/16	.1006	.1281	.1109
7/32	.1385	.1764	.1527	7/32	.1450	.1845	.1598	7/32	.1369	.1743	.1509
1/4	.1811	.2306	.1997	1/4	.1894	.2412	.2088	1/4	.1788	.2277	.1972
9/32	.2290	.2915	.2525	9/32	.2396	.3050	.2641	9/32	.2263	.2881	.2495
5/16	.2829	.3602	.3120	5/16	.2959	.3768	.3263	5/16	.2794	.3558	.3081
11/32	.3420	.4354	.3771	11/32	.358	.456	.394	11/32	.3380	.4303	.3727
3/8	.4074	.5188	.4493	3/8	.4261	.5426	.4699	3/8	.4024	.5124	.4437
13/32	.4776	.6082	.5267	13/32	.5000	.6365	.5513	13/32	.4720	.6009	.5204
7/16	.5546	.7061	.6115	7/16	.5800	.7386	.6396	7/16	.5477	.6974	.6039
15/32	.6359	.8096	.7012	15/32	.6660	.8478	.7343	15/32	.6290	.8007	.6935
1/2	.7243	.9222	.7987	1/2	.7576	.9646	.8354	1/2	.7154	.9108	.7888
17/32	.8167	1.040	.9006	17/32	.8560	1.089	.9438	17/32	.8080	1.028	.8909
9/16	.9167	1.167	1.011	9/16	.9588	1.221	1.057	9/16	.9054	1.153	.9983
19/32	1.020	1.299	1.125	19/32	1.068	1.359	1.177	19/32	1.009	1.284	1.112
5/8	1.132	1.441	1.248	5/8	1.184	1.507	1.305	5/8	1.118	1.423	1.232
21/32	1.246	1.587	1.374	21/32	1.305	1.661	1.438	21/32	1.233	1.565	1.359
11/16	1.369	1.744	1.510	11/16	1.432	1.824	1.579	11/16	1.353	1.722	1.491
23/32	1.495	1.903	1.648	23/32	1.566	1.993	1.726	23/32	1.479	1.882	1.629
3/4	1.630	2.075	1.797	3/4	1.705	2.170	1.880	3/4	1.610	2.049	1.775
25/32	1.766	2.249	1.948	25/32	1.849	2.353	2.038	25/32	1.747	2.223	1.926
13/16	1.913	2.435	2.109	13/16	2.001	2.547	2.206	13/16	1.889	2.405	2.083
27/32	2.060	2.623	2.272	27/32	2.157	2.745	2.378	27/32	2.038	2.594	2.247
7/8	2.218	2.824	2.446	7/8	2.320	2.954	2.558	7/8	2.191	2.789	2.416
29/32	2.377	3.026	2.621	29/32	2.489	3.168	2.744	29/32	2.351	2.992	2.592
15/16	2.546	3.242	2.808	15/16	2.663	3.391	2.937	15/16	2.515	3.202	2.773
31/32	2.716	3.458	2.994	31/32	2.843	3.619	3.134	31/32	2.686	3.419	2.961
1	2.897	3.689	3.195	1	3.030	3.858	3.341	1	2.862	3.643	3.155
1 1/16	3.271	4.164	3.607	1 1/16	3.421	4.356	3.772	1 1/16	3.230	4.113	3.562
1 1/8	3.667	4.669	4.043	1 1/8	3.835	4.883	4.229	1 1/8	3.622	4.611	3.993
1 3/16	4.086	5.202	4.505	1 3/16	4.273	5.441	4.712	1 3/16	4.035	5.138	4.449
1 1/4	4.527	5.764	4.992	1 1/4	4.735	6.029	5.221	1 1/4	4.471	5.693	4.930
1 5/16	4.991	6.355	5.503	1 5/16	5.220	6.647	5.756	1 5/16	4.929	6.276	5.435
1 3/8	5.478	6.974	6.040	1 3/8	5.729	7.295	6.317	1 3/8	5.410	6.888	5.965
1 7/16	5.987	7.623	6.602	1 7/16	6.262	7.973	6.905	1 7/16	5.913	7.529	6.520
1 1/2	6.519	8.300	7.188	1 1/2	6.818	8.681	7.518	1 1/2	6.438	8.198	7.099
1 9/16	7.073	9.006	7.800	1 9/16	7.398	9.420	8.158	1 9/16	6.986	8.895	7.703
1 5/8	7.651	9.741	8.436	1 5/8	8.002	10.19	8.824	1 5/8	7.556	9.621	8.332
1 11/16	8.250	10.50	9.097	1 11/16	8.630	10.99	9.515	1 11/16	8.149	10.38	8.985
1 3/4	8.873	11.30	9.784	1 3/4	9.281	11.82	10.23	1 3/4	8.763	11.16	9.663
1 13/16	9.518	12.12	10.50	1 13/16	9.955	12.68	10.98	1 13/16	9.401	11.97	10.37
1 7/8	10.19	12.97	11.23	1 7/8	10.65	13.56	11.75	1 7/8	10.06	12.81	11.09
1 15/16	10.88	13.85	11.99	1 15/16	11.38	14.48	12.54	1 15/16	10.74	13.68	11.84
2	11.59	14.76	12.78	2	12.12	15.43	13.37	2	11.45	14.57	12.62
2 1/8	13.08	16.66	14.43	2 1/8	13.68	17.42	15.09	2 1/8	12.92	16.45	14.25
2 1/4	14.67	18.68	16.17	2 1/4	15.34	19.53	16.92	2 1/4	14.49	18.44	15.97
2 3/8	16.34	20.81	18.02	2 3/8	17.09	21.76	18.85	2 3/8	16.14	20.55	17.80
2 1/2	18.11	23.06	19.97	2 1/2	18.94	24.12	20.88	2 1/2	17.88	22.77	19.72
2 5/8	19.96	25.42	22.01	2 5/8	20.88	26.59	23.02	2 5/8	19.72	25.11	21.74
2 3/4	21.91	27.90	24.16	2 3/4	22.92	29.18	25.27	2 3/4	21.64	27.55	23.86
2 7/8	23.95	30.49	26.41	2 7/8	25.05	31.89	27.62	2 7/8	23.65	30.12	26.08
3	26.08	33.20	28.75	3	27.27	34.73	30.07	3	25.75	32.79	28.40
3 1/4	30.6	38.9	33.7	3 1/4	32.01	40.75	35.29	3 1/4	30.22	38.48	33.33
3 1/2	35.5	45.2	39.1	3 1/2	37.12	47.27	40.93	3 1/2	35.05	44.63	38.65
3 3/4	40.7	51.8	44.9	3 3/4	42.61	54.26	46.99	3 3/4	40.24	51.24	44.37
4	46.0	58.6	51.0	4	48.49	61.73	53.46	4	45.78	58.29	50.48
4 1/4	52.3	66.5	57.6	4 1/4	54.74	69.69	60.36	4 1/4	51.69	65.81	56.99
4 1/2	58.7	74.7	64.7	4 1/2	61.37	78.13	67.67	4 1/2	57.75	73.78	63.89
4 3/4	65.4	83.3	72.1	4 3/4	68.37	87.06	75.39	4 3/4	64.56	82.20	71.17
5	72.4	92.2	79.8	5	75.76	96.46	83.54	5	71.54	91.08	78.88
5 1/4	79.9	101.7	88.1	5 1/4	83.5	106.3	92.1	5 1/4	78.9	100.4	87.0
5 1/2	87.6	111.5	96.6	5 1/2	91.6	116.6	101.0	5 1/2	86.6	110.2	95.5
5 3/4	95.8	122.0	105.5	5 3/4	100.2	127.6	110.5	5 3/4	94.6	120.4	104.3
6	104.2	132.8	115.0	6	109.1	138.9	120.3	6	103.0	131.1	113.6

Allegheny Stainless Steel Bars

Approximate Weights
Rounds, Squares and Hexagons
Pounds Per Lineal Foot

Size	Round	Square	Hexagon
1/16	.010	.013	.....
1/8	.042	.053	.046
3/16	.094	.120	.103
1/4	.168	.214	.184
5/16	.262	.334	.287
3/8	.378	.481	.414
7/16	.514	.655	.564
1/2	.671	.855	.736
9/16	.850	1.08	.932
5/8	1.05	1.33	1.15
11/16	1.27	1.62	1.39
3/4	1.51	1.92	1.66
13/16	1.77	2.26	1.94
7/8	2.06	2.62	2.25
15/16	2.36	3.01	2.58
1	2.68	3.42	2.94
1 1/16	3.01	3.84	3.32
1 1/8	3.38	4.30	3.73
1 3/16	3.76	4.79	4.15
1 1/4	4.17	5.31	4.60
1 5/16	4.60	5.86	5.07
1 3/8	5.02	6.43	5.57
1 7/16	5.52	7.03	6.08
1 1/2	6.01	7.65	6.62
1 9/16	6.52	8.30	7.19
1 5/8	7.05	8.98	7.77
1 11/16	7.60	9.68	8.38
1 3/4	8.18	10.41	9.02
1 13/16	8.77	11.17	9.67
1 7/8	9.39	11.95	10.35
1 15/16	10.02	12.76	11.05
2	10.68	13.60	11.78
2 1/16	11.36	14.46	.....
2 1/8	12.06	15.35	13.29
2 3/16	12.78	16.27	.....
2 1/4	13.52	17.22	14.90
2 5/16	14.28	18.19	.....
2 3/8	15.07	19.18	16.61
2 7/16	15.86	20.20	.....
2 1/2	16.69	21.25	18.40
2 5/8	18.40	23.43	20.29
2 3/4	20.20	25.00	22.27
2 7/8	22.07	28.10	24.34
3	24.03	30.60	26.50
3 1/8	26.08	33.20	28.75
3 1/4	28.20	35.92	31.10
3 3/8	30.42	38.73	33.54
3 1/2	32.71	41.65	36.07
3 5/8	35.09	44.68	38.69
3 3/4	37.56	47.82	41.41
3 7/8	40.10	51.05	44.21
4	42.73	54.40	47.11
4 1/4	48.24	61.41	.....
4 1/2	54.07	68.85	.....
4 3/4	60.25	76.71	.....
5	66.76	85.00	.....

Phosphor Bronze Rods

Approximate Weights
Rounds, Squares and Hexagons

Size	Round	Square	Hexagon
1/16	.012	.015	.....
1/8	.047	.060	.....
3/16	.106	.135	.116
1/4	.189	.240	.207
5/16	.296	.375	.324
3/8	.426	.540	.467
7/16	.580	.736	.636
1/2	.758	.960	.832
9/16	.958	1.215	1.05
5/8	1.18	1.50	1.29
11/16	1.42	1.81	1.56
3/4	1.70	2.16	1.88
13/16	1.99	2.53	2.19
7/8	2.32	2.94	2.56
15/16	2.65	3.37	2.92
1	3.03	3.84	3.34
1 1/8	3.84	4.86	4.21
1 1/4	4.74	6.00	5.22
1 3/8	5.73	7.27	6.29
1 1/2	6.82	8.65	7.52
1 5/8	8.00	10.15	8.75
1 3/4	9.28	11.77	10.15
1 7/8	10.61	13.52	11.69
2	12.12	15.38	13.37
2 1/8	13.64	17.36	15.03
2 1/4	15.29	19.47	16.86
2 3/8	17.03	21.69	18.77
2 1/2	18.87	24.03	20.80
2 5/8	20.81	26.50	22.94
2 3/4	22.84	29.08	25.18
2 7/8	24.92	31.79	27.47
3	27.18	34.61	29.96

Aluminum Rods

Approximate Weight Lineal Foot

Size	Round	Square	Hexagon
1/16	.004	.005	.....
1/8	.013	.018	.....
3/16	.032	.041	.036
1/4	.057	.079	.065
5/16	.090	.114	.102
3/8	.130	.165	.146
7/16	.177	.225	.199
1/2	.231	.294	.261
9/16	.291	.371	.330
5/8	.360	.459	.408
11/16	.435	.554	.493
3/4	.519	.661	.587
13/16	.608	.774	.689
7/8	.706	.899	.799
15/16	.809	1.030	.918
1	.923	1.180	1.044
1 1/16	1.039	1.323	1.179
1 1/8	1.165	1.484	1.322
1 3/16	1.298	1.653	1.473
1 1/4	1.439	1.832	1.632
1 5/16	1.586	2.019	1.799
1 3/8	1.741	2.217	1.975
1 7/16	1.903	2.423	2.159
1 1/2	2.072	2.638	2.350
1 9/16	2.248	2.862	2.551
1 5/8	2.431	3.096	2.758
1 11/16	2.622	3.339	2.975
1 3/4	2.820	3.590	3.199
1 13/16	3.025	3.852	3.433
1 7/8	3.237	4.122	3.672
1 15/16	3.457	4.401	3.920
2	3.683	4.690	4.179
2 1/8	4.158	5.294	4.718
2 1/4	4.662	5.935	5.287
2 3/8	5.194	6.613	5.892
2 1/2	5.755	7.328	6.530
2 5/8	6.345	8.079	7.197
2 3/4	6.964	8.866	7.900
2 7/8	7.611	9.691	8.636
3	8.287	10.55	9.401

Rectangular Aluminum Rod

Approximate Weights
Pounds Per Lineal Foot

Thick Inch	Width Inch ½	5/8	3/4	7/8	1	1 1/4
1/16	.0377	.0471	.0565	.0659	.0754	.0942
1/8	.0754	.0942	.1131	.1319	.1508	.1885
3/16	.1131	.1414	.1696	.1979	.2262	.2827
1/4	.1508	.1885	.2262	.2638	.3016	.3770
5/16	.1885	.2356	.2827	.3298	.3770	.4712
3/8	.2262	.2827	.3392	.3958	.4524	.5655
1/2	.3016	.3770	.4523	.5278	.6032	.7539

Thick Inch	Width Inch 1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
1/16	.1131	.1319	.1508	.1696	.1885	.2073
1/8	.2262	.2638	.3016	.3392	.3770	.4146
3/16	.3393	.3957	.4524	.5088	.5655	.6219
1/4	.4524	.5276	.6032	.6784	.7539	.8292
5/16	.5655	.6595	.7539	.8480	.9424	1.0365
3/8	.6786	.7914	.9048	1.0176	1.1309	1.2438
1/2	.9048	1.0552	1.2064	1.3568	1.5079	1.6584

Thick Inch	Width Inch 3	3 1/4	3 1/2	3 3/4	4	6
1/16	.2262	.2450	.2638	.2827	.3016	.4524
1/8	.4524	.4900	.5276	.5655	.6032	.9048
3/16	.6786	.7350	.7916	.8480	.9048	1.3572
1/4	.9048	.9800	1.0552	1.1307	1.2064	1.8096
5/16	1.1310	1.2250	1.3190	1.4134	1.5080	2.2620
3/8	1.3568	1.4700	1.5828	1.6961	1.8096	2.7136
1/2	1.8096	1.9600	2.1104	2.2616	2.4128	3.6192

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Approximate Weights of

Rectangular Brass Rod and Strips

Pounds Per Lineal Foot

Thick. Inch	Width in inches ½	⅝	¾	⅞	1	1¼	1½	1¾	2	2¼
1/16	.1153	.1441	.1729	.2017	.2306	.2882	.3458	.4035	.4611	.5190
3/32	.1729	.2161	.2594	.3026	.3458	.4323	.5187	.6057	.6917	.7780
1/8	.2306	.2882	.3458	.4035	.4611	.5763	.6917	.8069	.9222	1.0370
5/32	.2880	.3600	.4320	.5040	.5760	.7200	.8650	1.0090	1.1528	1.2970
3/16	.3458	.4323	.5188	.6057	.6917	.8646	1.0375	1.2104	1.3833	1.5560
1/4	.4611	.5764	.6917	.8069	.9222	1.1528	1.3833	1.6139	1.8444	2.0750
5/16	.5764	.7205	.8647	1.0087	1.1528	1.4409	1.7291	2.0173	2.3055	2.5940
3/8	.6917	.8646	1.0375	1.2104	1.3833	1.7291	2.0750	2.4208	2.7666	3.1120
1/2	.....	1.1530	1.3833	1.6139	1.8444	2.3055	2.7666	3.2278	3.6888	4.1500
5/8	.....	.....	1.7290	2.0173	2.3055	2.8819	3.4582	4.0347	4.6110	5.1870
3/4	.....	.....	.....	2.4208	2.7666	3.4583	4.1499	4.8416	5.5332	6.2250
7/8	.....	.....	.....	.....	3.2280	4.0350	4.8420	5.6480	6.4550	7.2620
1	.....	.....	.....	.....	.....	4.6110	5.5330	6.4550	7.3780	8.3000

Thick. Inch	Width in inches 2½	2¾	3	3¼	3½	3¾	4	4½	5	5½	6
1/16	.576	.634	.691	.749	.806	.864	.922	1.037	1.152	1.268	1.383
3/32	.864	.951	1.037	1.123	1.210	1.296	1.383	1.555	1.728	1.902	2.074
1/8	1.15	1.268	1.383	1.498	1.613	1.729	1.844	2.074	2.304	2.536	2.766
5/32	1.441	1.585	1.729	1.873	2.017	2.161	2.305	2.592	2.880	3.170	3.457
3/16	1.729	1.902	2.075	2.247	2.420	2.593	2.766	3.111	3.456	3.804	4.149
1/4	2.305	2.536	2.766	2.997	3.227	3.458	3.688	4.148	4.608	5.072	5.532
5/16	2.882	3.170	3.458	3.746	4.034	4.323	4.611	5.185	5.760	6.340	6.915
3/8	3.458	3.804	4.150	4.495	4.841	5.187	5.533	6.222	6.912	7.608	8.298
1/2	4.611	5.072	5.533	5.994	6.455	6.916	7.377	8.296	9.216	10.140	11.060
5/8	5.764	6.340	6.916	7.493	8.069	8.646	9.222	10.370	11.520	12.680	13.830
3/4	6.916	7.608	8.299	8.990	9.682	10.370	11.060	12.440	13.820	15.210	16.590
7/8	8.069	8.876	9.682	10.490	11.290	12.100	12.910	14.510	16.120	17.750	19.360
1	9.222	10.140	11.060	11.980	12.910	13.830	14.750	16.590	18.430	20.280	22.130

Approximate Weights of

Rectangular Drawn Copper Bus Bars

Pounds Per Lineal Foot

Thick. Inch	Width in inches ½	⅝	¾	⅞	1	1¼	1½	1¾	2	2¼
1/16	.1206	.1507	.1809	.2110	.2412	.3014	.3617	.....	.....	.....
3/32	.1809	.2261	.2713	.3165	.3617	.4522	.5426	.6330	.7235	.....
1/8	.2412	.3014	.3617	.4220	.4823	.6029	.7235	.8440	.9646	1.085
5/32	.3014	.3768	.4522	.5275	.6029	.7535	.9043	1.055	1.206	1.356
3/16	.3617	.4522	.5426	.6330	.7235	.9043	1.085	1.266	1.447	1.628
1/4	.4823	.6029	.7235	.8440	.9646	1.206	1.447	1.688	1.929	2.170
5/16	.6029	.7535	.9043	1.055	1.206	1.507	1.809	2.110	2.412	2.713
3/8	.7235	.9043	1.085	1.266	1.447	1.809	2.170	2.532	2.894	3.256
1/2	.....	1.206	1.447	1.688	1.929	2.412	2.894	3.376	3.858	4.341
5/8	.....	.....	.....	.....	2.412	3.014	3.617	4.220	4.823	5.426
3/4	.....	.....	.....	.....	2.894	3.617	4.341	5.064	5.788	6.511
7/8	.....	.....	.....	.....	3.376	4.220	5.064	5.908	6.752	7.596
1	.....	.....	.....	.....	3.858	4.823	5.788	6.752	7.717	8.681

Thick. Inch	Width in inches 2½	2¾	3	3¼	3½	3¾	4	4½	5	5½	6
1/8	1.206	1.326	1.447	.....	.....	.....	.....	.....	.....	.....	.....
5/32	1.507	1.658	1.809	.....	.....	.....	.....	.....	.....	.....	.....
3/16	1.809	1.989	2.170	.....	.....	.....	.....	.....	.....	.....	.....
1/4	2.412	2.653	2.894	.....	.....	.....	.....	.....	.....	.....	.....
5/16	3.014	3.316	3.617	.....	.....	.....	.....	.....	.....	.....	.....
3/8	3.617	3.979	4.341	4.702	5.064	5.426	5.788	6.511	7.235	.....	.....
1/2	4.823	5.305	5.788	6.270	6.752	7.235	7.717	8.681	9.646	10.61	11.58
5/8	6.029	6.631	7.235	7.837	8.440	9.043	9.646	10.85	12.06	13.26	14.47
3/4	7.235	7.958	8.681	9.405	10.13	10.85	11.58	13.02	14.47	15.92	17.36
7/8	8.440	9.283	10.13	10.97	11.82	12.66	13.50	15.19	16.88	18.57	20.25
1	9.646	10.61	11.58	12.54	13.50	14.47	15.43	17.36	19.29	21.22	23.15

Specific gravity 8.90 = .3215 pounds per cubic inch.

Visit our warehouse and see our immense stock of metals.

Allegheny Stainless Steel Flat Rolled Bars

Approximate Weight

Pounds Per Lineal Foot
Width—Inches

Thickness Inches	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝	1¾	2	2¼	2½	2¾	3
1/16	.1060	.1381	.1594	.1859	.212	.2391	.2656	.292	.319	.346	.372	.425	.478	.531	.584	.638
1/8	.2125	.2656	.3188	.3720	.4250	.4782	.5312	.585	.638	.692	.744	.850	.96	1.06	1.17	1.28
3/16	.319	.399	.478	.558	.638	.717	.797	.875	.957	1.04	1.15	1.28	1.44	1.59	1.75	1.91
1/4	.425	.531	.636	.743	.850	.937	1.06	1.17	1.28	1.38	1.49	1.70	1.92	2.12	2.34	2.55
5/16	.531	.664	.797	.929	1.06	1.20	1.33	1.46	1.59	1.73	1.86	2.12	2.39	2.65	2.92	3.19
3/8	.638	.797	.957	1.116	1.28	1.43	1.59	1.76	1.92	2.08	2.23	2.55	2.87	3.19	3.51	3.83
7/16	.744	.929	1.116	1.302	1.49	1.68	1.86	2 05	2.23	2.42	2.60	2.98	3.35	3.72	4.09	4.46
1/2	.850	1.06	1.275	1.487	1.70	1.92	2.12	2.34	2.55	2.72	2.98	3.40	3.83	4.25	4.67	5.10
9/16	.957	1.20	1.434	1.674	1.92	2.15	2.39	2.63	2.87	3.11	3.35	3.83	4.30	4.78	5.26	5 74
5/8	1.06	1.33	1.594	1.859	2.12	2.39	2.65	2.92	3.19	3.46	3.72	4.25	4.78	5.31	5.84	6 38
11/16	1.17	1.46	1.753	2.045	2.34	2.63	2.92	3.22	3 51	3.80	4.09	4.67	5.26	5.84	6.43	7.02
3/4	1.28	1.60	1.913	2.232	2.55	2.87	3.19	3.51	3.83	4.15	4.47	5.10	5.75	6.38	7.02	7 65
13/16	1.38	1.73	2.072	2.417	2.76	3.11	3.45	3.80	4.14	4.49	4.84	5.53	6.21	6.90	7.60	8.29
7/8	1.49	1.86	2.232	2.604	2.98	3.35	3.72	4.09	4.47	4.84	5.30	5.95	6.69	7.44	8.18	8.93
15/16	1.60	1.99	2.391	2.789	3.19	3.59	3.99	4.39	4.78	5.18	5.58	6.38	7.18	7.97	8.77	9.57
1	1.70	2.13	2.55	2.98	3.40	3.83	4.25	4.68	5.10	5.53	5.95	6.80	7.65	8.50	9.35	10.20

Thickness Inches	3¼	3½	3¾	4	4¼	4½	4¾	5	5¼	5½	5¾	6	6¼	6½	6¾	7
1/16	.691	.744	.80	.85	.90	.96	1.01	1.06	1.116	1.169	1.222	1.275	1.328	1.381	1.434	1.487
1/8	1.38	1.49	1.59	1.70	1.81	1.91	2.02	2.13	2.232	2.338	2.444	2.550	2.656	2.762	2.869	2.975
3/16	2.07	2.23	2.39	2.55	2.71	2.87	3.03	3.19	3.35	3.51	3.67	3.83	3.99	4.14	4.30	4.46
1/4	2.76	2.98	3.19	3.40	3.61	3.83	4.04	4.25	4.46	4.67	4.89	5.10	5.31	5.53	5.74	5.95
5/16	3.45	3.72	3.99	4.25	4.52	4.78	5.05	5.31	5.58	5.84	6.11	6.38	6.64	6.90	7.71	7.44
3/4	4.15	4.47	4.78	5.10	5.42	5.74	6.06	6.38	6.69	7.02	7.34	7.65	7.97	8.29	8.61	8.93
7/16	4.83	5.20	5.58	5.95	6.32	6.70	7.07	7.44	7.81	8.18	8.56	8.93	9.29	9.67	10.04	10.41
1/2	5.53	5.95	6.38	6.80	7.22	7.65	8.08	8.50	8.93	9.35	9.77	10.20	10.63	11.05	11.48	11.90
9/16	6.22	6.70	7.17	7.65	8.13	8.61	9.09	9.57	10.04	10.52	11.00	11.48	11.95	12.43	12.91	13.39
5/8	6.91	7.44	7.97	8.50	9.03	9.57	10.10	10.63	11.16	11.69	12.22	12.75	13.28	13.81	14.34	14.87
11/16	7.60	8.18	8.76	9.35	9.93	10.52	11.11	11.69	12.27	12.85	13.44	14.03	14.61	15.20	15.78	16.36
3/4	8.29	8.93	9.57	10.20	10.84	11.48	12.12	12.75	13.39	14.03	14.67	15.30	15.94	16.58	17.22	17.85
13/16	8.98	9.67	10.36	11.05	11.74	12.43	13.12	13.81	14.50	15.19	15.88	16.58	17.27	17.95	18.56	19.34
7/8	9.67	10.41	11.16	11.90	12.65	13.39	14.13	14.87	15.62	16.36	17.10	17.85	18.60	19.34	20.08	20 83
15/16	10.36	11.16	11.95	12.75	13.55	14.34	15.14	15.94	16.74	17.53	18.33	19.13	19.92	20.72	21.51	22.32
1	11.05	11.90	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.55	20.40	21.25	22.10	22.95	23.80

Thickness Inches	7¼	7½	7¾	8	8¼	8½	8¾	9	9¼	9½	9¾	10	10¼	10½	11	12
1/16	1.540	1.594	1.647	1.70	1.753	1.806	1.859	1.913	1.965	2.019	2.078	2.135	2.178	2.232	2.338	2.55
1/8	3.081	3.188	3.294	3.40	3.506	3.612	3.720	3.826	3.931	4.037	4.144	4.250	4.356	4.463	4.676	5.1
3/16	4.62	4.78	4.94	5.10	5.26	5.42	5.58	5.74	5.90	6.06	6.22	6.38	6.54	6.70	7.02	7.65
1/4	6.16	6.38	6.58	6.80	7.01	7.22	7.43	7.65	7.86	8.09	8.29	8.50	8.71	8.92	9.34	10.20
5/16	7.70	7.97	8.23	8.50	8.76	9.03	9.29	9.56	9.83	10.10	10.36	10.62	10.89	11.16	11.68	12.75
3/8	9.25	9.57	9.88	10.20	10.52	10.84	11.16	11.48	11.80	12.12	12.44	12.75	13.07	13.39	14.03	15.30
7/16	10.78	11.16	11.53	11.90	12.27	12.64	13.02	13.40	13.76	14.14	14.51	14.88	15.25	15.62	16.36	17.85
1/2	12.32	12.75	13.18	13.60	14.03	14.44	14.87	15.30	15.73	16.16	16.58	17.00	17.42	17.85	18.70	20.40
9/16	13.86	14.34	14.82	15.30	15.78	16.26	16.74	17.22	17.69	18.18	18.65	19.14	19.61	20.08	21.02	22.95
5/8	15.40	15.94	16.47	17.00	17.53	18.06	18.59	19.13	19.65	20.19	20.72	21.35	21.78	22.32	23.38	25.50
11/16	16.94	17.53	18.12	18.70	19.28	19.86	20.45	21.04	21.62	22.21	22.79	23.38	23.96	24.54	25.70	28.05
3/4	18.49	19.13	19.77	20.40	21.04	21.68	22.32	22.96	23.59	24.23	24.86	25.50	26.14	26.78	28.05	30.60
13/16	20.03	20.72	21.41	22.10	22.79	23.48	24.17	24.86	25.55	26.24	26.94	27.62	28.32	29.00	30.40	33.15
7/8	21.57	22.32	23.05	23.80	24.55	25.30	26.04	26.78	27.52	28.26	29.01	29.75	30.50	31.34	32.72	35.70
15/16	23.11	23.91	24.70	25.50	26.30	27.10	27.89	28.69	29.49	30 28	31.08	31.88	32.67	33.48	35.06	38.25
1	24.65	25.50	26.35	27.20	29.05	28.90	29.75	30.60	31.45	32.20	33.15	34.00	34.85	35.70	37.40	40.80

Approximate Weights of Wire

Per Lineal Foot

Brown and Sharpe's Gauge

Gauge Nos. B. & S.	Decimal Parts of Inch	Copper	Brass	Phosphor Bronze	18% Nickel Silver	Aluminum	Stainless Steel	Steel	Gauge Nos. B. & S.
0000	.4600	.64120	.60518	.64051	.6254	.1920	.58097	.56603	0000
000	.4096	.50850	.47991	.50795	.4960	.1523	.46074	.44888	000
00	.3648	.40530	.38067	.40283	.3933	.1208	.36539	.35599	00
0	.3249	.31980	.30182	.31945	.3111	.09581	.28976	.28230	0
1	.2893	.25360	.2411	.25334	.2474	.07596	.22979	.22389	1
2	.2576	.20110	.1912	.20091	.1962	.06023	.18224	.17755	2
3	.2294	.15950	.1516	.15932	.1551	.04776	.14451	.14080	3
4	.2043	.12650	.11938	.12635	.1234	.03788	.11461	.11166	4
5	.1819	.10030	.09466	.10020	.09784	.03003	.09088	.08854	5
6	.1620	.07995	.07563	.07946	.07759	.0242	.07208	.07022	6
7	.1443	.06309	.05954	.06301	.06153	.01890	.05716	.05568	7
8	.1285	.05003	.04756	.04998	.04879	.0151	.04533	.04416	8
9	.1144	.03968	.03772	.03964	.03870	.01188	.03595	.03502	9
10	.1019	.03146	.02991	.03143	.03069	.0095	.02850	.02777	10
11	.09074	.02490	.02372	.02492	.02434	.0076	.02261	.02202	11
12	.08081	.01979	.01881	.01977	.01930	.0060	.01793	.01746	12
13	.07196	.01569	.01492	.01567	.01531	.004705	.01422	.01385	13
14	.06408	.01244	.01193	.01244	.01214	.0038	.01128	.01098	14
15	.05707	.009869	.009383	.009860	.009626	.003959	.00894	.008712	15
16	.05092	.007827	.007441	.00782	.007633	.0023	.00709	.006909	16
17	.04526	.006209	.005901	.00619	.006053	.001862	.005622	.005478	17
18	.04030	.004922	.004679	.00492	.004801	.0014	.004459	.004344	18
19	.03589	.003904	.003711	.00389	.003807	.001170	.003536	.003445	19
20	.03196	.003096	.002943	.00309	.003019	.0009	.002806	.002734	20
21	.02846	.002455	.002334	.00245	.002394	.0007372	.002224	.002167	21
22	.02535	.001947	.001851	.00194	.001899	.0006	.001764	.001719	22
23	.02257	.001544	.001468	.001542	.001506	.0004636	.001399	.001363	23
24	.02010	.001224	.001164	.00122	.001194	.0003667	.001109	.001081	24
25	.01790	.0009699	.0009231	.0009699	.0009470	.0002908	.0008797	.0008571	25
26	.01594	.0007695	.0007321	.00077	.0007510	.0002295	.0006977	.0006797	26
27	.01420	.0006099	.0005805	.0006099	.0005956	.0001830	.0005532	.0005391	27
28	.01264	.0004850	.0004604	.00048	.0004723	.0001441	.0004387	.0004275	28
29	.01126	.0003835	.0003651	.0003835	.0003746	.0001159	.0003478	.0003389	29
30	.01003	.0003046	.0002896	.0003046	.0002970	.00009076	.0002759	.0002688	30
31	.00893	.0002415	.0002297	.0002413	.0002356	.00007238	.0002189	.0002132	31
32	.007950	.0001915	.0001821	.0001915	.0001868	.00005736	.0001735	.0001691	32
33	.007080	.0001519	.0001434	.0001517	.0001481	.00004549	.0001375	.0001341	33
34	.00630	.0001205	.0001137	.0001205	.0001175	.00003602	.0001092	.0001063	34
35	.005614	.0000956	.0000915	.0000956	.00009317	.00002856	.00008671	.00008445	35
36	.005000	.0000757	.0000715	.0000757	.00007389	.00002269	.00006866	.00006687	36
37	.004453	.00006003	.00005671	.00006003	.00005860	.00001797	.00005445	.00005304	37
38	.003965	.00004758	.00004496	.00004758	.00004647	.00001423	.00004315	.00004305	38
39	.003531	.00003755	.00003566	.00003755	.00003685	.00001131	.00003406	.00003236	39
40	.003144	.00002992	.00002827	.00002992	.00002922	.00000895	.00002714	.00002644	40

Round Brass Rods

Pounds Per Thousand Pieces

Length Inches	Diameter Inches 1/16	3/32	1/8	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8	13/32
1/16	.05887	.1324	.2355	.3679	.5298	.7211	.9419	1.192	1.472	1.781	2.119	2.487
1/8	.1177	.2649	.4709	.7358	1.060	1.442	1.884	2.384	2.943	3.561	4.238	4.974
3/16	.1766	.3974	.7064	1.104	1.589	2.163	2.826	3.576	4.415	5.342	6.358	7.461
1/4	.2355	.5298	.9419	1.472	2.119	2.884	3.767	4.768	5.887	7.123	8.477	9.948
5/16	.2943	.6622	1.177	1.840	2.649	3.606	4.709	5.960	7.358	8.904	10.60	12.44
3/8	.3532	.7947	1.413	2.207	3.179	4.327	5.651	7.152	8.830	10.68	12.72	14.92
7/16	.4121	.9271	1.648	2.575	3.709	5.048	6.593	8.344	10.30	12.46	14.83	17.41
1/2	.4709	1.060	1.884	2.943	4.238	5.769	7.535	9.536	11.77	14.25	16.95	19.90
9/16	.5298	1.192	2.119	3.311	4.768	6.490	8.477	10.73	13.24	16.03	19.07	22.38
5/8	.5887	1.324	2.355	3.679	5.298	7.211	9.419	11.92	14.72	17.81	21.19	24.87
11/16	.6475	1.457	2.590	4.047	5.828	7.932	10.36	13.11	16.19	19.59	23.31	27.36
3/4	.7064	1.589	2.826	4.415	6.358	8.653	11.30	14.30	17.66	21.37	25.43	29.85
13/16	.7653	1.722	3.061	4.783	6.887	9.375	12.24	15.50	19.13	23.15	27.55	32.33
7/8	.8241	1.854	3.297	5.151	7.417	10.10	13.19	16.69	20.60	24.93	29.67	34.82
15/16	.8830	1.987	3.532	5.519	7.947	10.82	14.13	17.88	22.07	26.71	31.79	37.31
1	.9419	2.119	3.767	5.887	8.477	11.54	15.07	19.07	23.55	28.49	33.91	39.79
1 1/16	1.001	2.252	4.003	6.255	9.007	12.26	16.01	20.26	25.02	30.27	36.03	42.28
1 1/8	1.060	2.384	4.238	6.623	9.536	12.98	16.95	21.46	26.49	32.05	38.15	44.77
1 3/16	1.118	2.517	4.474	6.990	10.07	13.70	17.90	22.65	27.96	33.83	40.26	47.25
1 1/4	1.177	2.649	4.709	7.358	10.60	14.42	18.84	23.84	29.43	35.61	42.38	49.74
1 5/16	1.236	2.781	4.945	7.726	11.13	15.14	19.78	25.03	30.91	37.40	44.50	52.23
1 3/8	1.295	2.914	5.180	8.094	11.66	15.86	20.72	26.23	32.38	39.18	46.62	54.72
1 7/16	1.354	3.046	5.416	8.462	12.19	16.59	21.66	27.42	33.85	40.96	48.74	57.20
1 1/2	1.413	3.179	5.651	8.830	12.72	17.31	22.60	28.61	35.32	42.74	50.86	59.69
1 9/16	1.472	3.311	5.887	9.198	13.24	18.03	23.55	29.80	36.79	44.52	52.98	62.18
1 5/8	1.531	3.444	6.122	9.566	13.77	18.75	24.49	30.99	38.26	46.30	55.10	64.66
1 11/16	1.589	3.576	6.358	9.934	14.30	19.47	25.43	32.19	39.74	48.08	57.22	67.15
1 3/4	1.648	3.709	6.593	10.30	14.83	20.19	26.37	33.38	41.21	49.86	59.34	69.64
1 13/16	1.707	3.841	6.828	10.67	15.36	20.91	27.31	34.57	42.68	51.64	61.46	72.13
1 7/8	1.766	3.974	7.064	11.04	15.89	21.63	28.26	35.76	44.15	53.42	63.58	74.61
1 15/16	1.825	4.106	7.299	11.41	16.42	22.35	29.20	36.95	45.62	55.20	65.70	77.10
2	1.884	4.238	7.535	11.77	16.95	23.08	30.14	38.15	47.09	56.98	67.81	79.59

Length Inches	Diameter Inches 7/16	15/32	1/2	17/32	9/16	19/32	5/8	21/32	11/16	23/32	3/4	25/32
1/16	2.884	3.311	3.767	4.253	4.768	5.313	5.887	6.490	7.123	7.785	8.477	9.198
1/8	5.769	6.622	7.535	8.506	9.536	10.63	11.77	12.98	14.25	15.57	16.95	18.40
3/16	8.653	9.934	11.30	12.76	14.30	15.94	17.66	19.47	21.37	23.36	25.43	27.59
1/4	11.54	13.24	15.07	17.01	19.07	21.25	23.55	25.96	28.49	31.14	33.91	36.79
5/16	14.42	16.56	18.84	21.27	23.84	26.56	29.43	32.45	35.61	38.93	42.38	45.99
3/8	17.31	19.87	22.60	25.52	28.61	31.88	35.32	38.94	42.74	46.71	50.86	55.19
7/16	20.19	23.18	26.37	29.77	33.38	37.19	41.21	45.43	49.86	54.50	59.34	64.39
1/2	23.08	26.49	30.14	34.03	38.15	42.50	47.09	51.92	56.98	62.28	67.81	73.58
9/16	25.96	29.80	33.91	38.28	42.91	47.81	52.98	58.41	64.11	70.07	76.29	82.78
5/8	28.84	33.11	37.67	42.53	47.68	53.13	58.87	64.90	71.23	77.85	84.77	91.98
11/16	31.73	36.42	41.44	46.78	52.45	58.44	64.75	71.39	78.35	85.64	93.24	101.2
3/4	34.61	39.74	45.21	51.04	57.22	63.75	70.64	77.88	85.47	93.42	101.7	110.4
13/16	37.50	43.05	48.98	55.29	61.99	69.06	76.53	84.37	92.60	101.2	110.2	119.6
7/8	40.38	46.36	52.74	59.54	66.75	74.38	82.41	90.86	99.72	109.0	118.7	128.8
15/16	43.27	49.67	56.51	63.80	71.52	79.69	88.30	97.35	106.8	116.8	127.2	138.0
1	46.15	52.98	60.28	68.05	76.29	85.00	94.19	103.8	114.0	124.6	135.6	147.2
1 1/16	49.04	56.29	64.05	72.30	81.06	90.32	100.1	110.3	121.1	132.3	144.1	156.4
1 1/8	51.92	59.60	67.81	76.56	85.83	95.63	106.0	116.8	128.2	140.1	152.6	165.6
1 3/16	54.80	62.91	71.58	80.81	90.60	100.9	111.8	123.3	135.3	147.9	161.1	174.8
1 1/4	57.69	66.22	75.35	85.06	95.36	106.3	117.7	129.8	142.5	155.7	169.5	184.0
1 5/16	60.57	69.54	79.12	89.32	100.1	111.6	123.6	136.3	149.6	163.5	178.0	193.2
1 3/8	63.46	72.85	82.88	93.57	104.9	116.9	129.5	142.8	156.7	171.3	186.5	202.4
1 7/16	66.34	76.16	86.65	97.82	109.7	122.2	135.4	149.3	163.8	179.1	195.0	211.6
1 1/2	69.23	79.47	90.42	102.1	114.4	127.5	141.3	155.8	170.9	186.8	203.4	220.7
1 9/16	72.11	82.78	94.19	106.3	119.2	132.8	147.2	162.3	178.1	194.6	211.9	229.9
1 5/8	75.00	86.09	97.95	110.6	124.0	138.1	153.1	168.7	185.2	202.4	220.4	239.1
1 11/16	77.88	89.40	101.7	114.8	128.7	143.4	158.9	175.2	195.3	210.2	228.9	248.3
1 3/4	80.76	92.71	105.5	119.1	133.5	148.8	164.8	181.7	199.4	218.0	237.3	257.5
1 13/16	83.65	96.03	109.3	123.3	138.3	154.1	170.7	188.2	206.6	225.8	245.8	266.7
1 7/8	86.53	99.34	113.0	127.6	143.0	159.4	176.6	194.7	213.7	233.6	254.3	275.9
1 15/16	89.42	102.6	116.8	131.8	147.8	164.7	182.5	201.2	220.8	241.3	262.8	285.1
2	92.30	106.0	120.6	136.1	152.6	170.0	188.4	207.7	227.9	249.1	271.3	294.3

Variations from these weights must be expected in practice.

Round Brass Rods

Pounds Per Thousand Pieces

Length Inches	Diameter, Inches 13/16	27/32	7/8	29/32	15/16	31/32	1	1 1/16	1 1/8	1 3/16	1 1/4	1 5/16
1/16	9.948	10.73	11.54	12.38	13.24	14.14	15.07	17.01	19.07	21.25	23.55	25.96
1/8	19.90	21.46	23.08	24.75	26.49	28.29	30.14	34.03	38.15	42.50	47.09	51.92
3/16	29.85	32.19	34.61	37.13	39.74	42.43	45.21	51.04	57.22	63.75	70.64	77.88
1/4	39.79	42.91	46.15	49.51	52.98	56.57	60.28	68.05	76.29	85.00	94.19	103.8
5/16	49.74	53.64	57.69	61.88	66.22	70.71	75.35	85.06	95.36	106.3	117.7	129.8
3/8	59.69	64.37	69.23	74.26	79.47	84.86	90.42	102.1	114.4	127.5	141.3	155.8
7/16	69.64	75.10	80.76	86.64	92.71	99.00	105.5	119.1	133.5	148.8	164.8	181.7
1/2	79.59	85.83	92.30	99.01	106.0	113.1	120.6	136.1	152.6	170.0	188.4	207.7
9/16	89.54	96.56	103.8	111.4	119.2	127.3	135.6	153.1	171.7	191.3	211.9	233.6
5/8	99.48	107.3	115.4	123.8	132.4	141.4	150.7	170.1	190.7	212.5	235.5	259.6
11/16	109.4	118.0	126.9	136.1	145.7	155.6	165.8	187.1	209.8	233.8	259.0	285.6
3/4	119.4	128.7	138.5	148.5	158.9	169.7	180.8	204.1	228.9	255.0	282.6	311.5
13/16	129.3	139.5	150.0	160.9	172.2	183.9	195.9	221.2	247.9	276.3	306.1	337.5
7/8	139.3	150.2	161.5	173.3	185.4	198.0	211.0	238.2	267.0	297.5	329.7	363.4
15/16	149.2	160.9	173.1	185.7	198.7	212.1	226.0	255.2	286.1	318.8	353.2	389.4
1	159.2	171.7	184.6	198.0	211.9	226.3	241.1	272.2	305.2	340.0	376.7	415.4
1 1/16	169.1	182.4	196.1	210.4	225.2	240.4	256.2	289.2	324.2	361.3	400.3	441.3
1 1/8	179.1	193.1	207.7	222.8	238.4	254.6	271.3	306.2	343.3	382.5	423.8	467.3
1 3/16	189.0	203.8	219.2	235.2	251.7	268.7	286.3	323.2	362.4	403.8	447.4	493.2
1 1/4	199.0	214.6	230.8	247.5	264.9	282.9	301.4	340.3	381.5	425.0	470.9	519.2
1 5/16	208.9	225.3	242.3	259.9	278.1	297.0	316.5	357.3	400.5	446.3	494.5	545.2
1 3/8	218.9	236.0	253.8	272.3	291.4	311.1	331.5	374.3	419.6	467.5	518.0	571.1
1 7/16	228.8	246.8	265.4	284.7	304.6	325.3	346.6	391.3	438.7	488.8	541.6	597.1
1 1/2	238.8	257.5	276.9	297.0	317.9	339.4	361.7	408.3	457.7	510.0	565.1	623.0
1 9/16	248.7	268.2	288.4	309.4	331.1	353.6	376.7	425.3	476.8	531.3	588.7	649.0
1 5/8	258.7	278.9	300.0	321.8	344.4	367.7	391.8	442.3	495.9	552.5	612.2	675.0
1 11/16	268.6	289.7	311.5	334.2	357.6	381.9	406.9	459.3	515.0	573.8	635.8	700.9
1 3/4	278.6	300.4	323.1	346.5	370.9	396.0	422.0	476.4	534.0	595.0	659.3	726.9
1 13/16	288.5	311.1	334.6	358.9	384.1	410.1	437.0	493.4	553.1	616.3	682.8	752.8
1 7/8	298.5	321.9	346.1	371.3	397.4	424.3	452.1	510.4	572.2	637.5	706.4	778.8
1 15/16	308.4	332.6	357.7	383.7	410.6	438.4	467.2	527.4	591.3	658.8	729.9	804.8
2	318.3	343.3	369.2	396.1	423.8	452.6	482.2	544.4	610.3	680.0	753.5	830.7

Length Inches	Diameter, Inches 1 3/8	1 7/16	1 1/2	1 9/16	1 5/8	1 11/16	1 3/4	1 13/16	1 7/8	1 15/16	2
1/16	28.49	31.14	33.91	36.79	39.79	42.91	46.15	49.51	52.98	56.57	60.28
1/8	56.98	62.28	67.81	73.58	79.59	85.83	92.30	99.01	106.0	113.1	120.6
3/16	85.47	93.42	101.7	110.4	119.4	128.7	138.5	148.5	158.9	169.7	180.8
1/4	114.0	124.6	135.6	147.2	159.2	171.7	184.6	198.0	211.9	226.3	241.1
5/16	142.5	155.7	169.5	184.0	199.0	214.6	230.8	247.5	264.9	282.9	301.4
3/8	170.9	186.8	203.4	220.7	238.8	257.5	276.9	297.0	317.9	339.4	361.7
7/16	199.4	218.0	237.4	257.5	278.6	300.4	323.1	346.5	370.9	396.0	422.0
1/2	227.9	249.1	271.3	294.3	318.4	343.3	369.2	396.1	423.8	452.6	482.2
9/16	256.4	280.3	305.2	331.1	358.1	386.2	415.4	445.6	476.8	509.1	542.5
5/8	284.9	311.4	339.1	367.9	397.9	429.1	461.5	495.1	529.8	565.7	602.8
11/16	313.4	342.5	373.0	404.7	437.7	472.1	507.7	544.6	582.8	622.3	663.1
3/4	341.9	373.7	406.9	441.5	477.5	515.0	553.8	594.1	635.8	678.8	723.4
13/16	370.4	404.8	440.8	478.3	517.3	557.9	600.0	643.6	688.7	735.4	783.6
7/8	398.9	436.0	474.7	515.1	557.1	600.8	646.1	693.1	741.7	792.0	843.9
15/16	427.4	467.1	508.6	551.9	596.9	643.7	692.3	742.6	794.7	848.6	904.2
1	455.9	498.2	542.5	588.7	636.7	686.6	738.4	792.1	847.7	905.1	964.5
1 1/16	484.4	529.4	576.4	625.5	676.5	729.5	784.6	841.6	900.7	961.7	1025.
1 1/8	512.8	560.5	610.3	662.3	716.3	772.4	830.7	891.1	953.6	1018.	1085.
1 3/16	541.3	591.7	644.2	699.0	756.1	815.4	876.9	940.6	1007.	1075.	1145.
1 1/4	569.8	622.8	678.1	735.8	795.9	858.3	923.0	990.1	1060.	1131.	1206.
1 5/16	598.3	653.9	712.0	772.6	835.7	901.2	969.2	1040.	1113.	1188.	1266.
1 3/8	626.8	685.1	746.0	809.4	875.5	944.1	1015.	1089.	1166.	1245.	1326.
1 7/16	655.3	716.2	779.9	846.2	915.3	987.0	1061.	1139.	1219.	1301.	1386.
1 1/2	683.8	747.4	813.8	883.0	955.1	1030.	1108.	1188.	1272.	1358.	1447.
1 9/16	712.3	778.5	847.7	919.8	994.8	1073.	1154.	1238.	1324.	1414.	1507.
1 5/8	740.8	809.6	881.6	956.6	1035.	1116.	1200.	1287.	1377.	1471.	1567.
1 11/16	769.3	840.8	915.5	993.4	1074.	1159.	1246.	1337.	1430.	1527.	1628.
1 3/4	797.8	871.9	949.4	1030.	1114.	1202.	1292.	1386.	1483.	1584.	1688.
1 13/16	826.3	903.1	983.3	1067.	1154.	1245.	1338.	1436.	1536.	1641.	1748.
1 7/8	854.7	934.2	1017.	1104.	1194.	1287.	1385.	1485.	1589.	1697.	1808.
1 15/16	883.2	965.4	1051.	1141.	1234.	1330.	1431.	1535.	1642.	1754.	1869.
2	911.7	996.5	1085.	1177.	1273.	1373.	1477.	1584.	1695.	1810.	1929.

Variations from these weights must be expected in practice.

Sheet Brass, Tobin Bronze and Nickel Silver

Weights per Square Foot

Brown & Sharpe's Gauge

Gauge No.	Thickness Decimal Equivalent	Pounds per Square Foot Brass	Nickel Silver (18%)
4/0	.4600	20.27	20.95
3/0	.4096	18.05	18.65
2/0	.3648	16.07	16.61
0	.3249	14.31	14.79
1	.2893	12.75	13.17
2	.2576	11.35	11.73
3	.2294	10.11	10.45
4	.2043	9.003	9.303
5	.1819	8.017	8.284
6	.1620	7.139	7.377
7	.1443	6.358	6.570
8	.1285	5.662	5.851
9	.1144	5.042	5.210
10	.1019	4.490	4.640
11	.0907	3.998	4.132
12	.0808	3.561	3.679
13	.0720	3.171	3.277
14	.0641	2.824	2.918
15	.0571	2.515	2.598
16	.0508	2.239	2.314
17	.0453	1.994	2.061
18	.0403	1.776	1.835
19	.0359	1.582	1.634
20	.0320	1.408	1.455
21	.0285	1.254	1.296
22	.0254	1.117	1.154
23	.0226	.9946	1.028
24	.0201	.8857	.9153
25	.0179	.7887	.8150
26	.0159	.7024	.7258
27	.0142	.6255	.6464
28	.0126	.5570	.5756
29	.0113	.4961	.5126
30	.0100	.4417	.4565
31	.0089	.3934	.4065
32	.0080	.3503	.3620
33	.0071	.3120	.3224
34	.0063	.2778	.2871
35	.0056	.2474	.2557
36	.0050	.2203	.2277
37	.0045	.1962	.2027
38	.0040	.1747	.1805
39	.0035	.1556	.1608
40	.0031	.1386	.1432

Thickness in Inches

Inches	Thickness Decimal Equivalent	Pounds per Square Foot Brass	Tobin Bronze	Nickel Silver (18%)
1/16	.0625	2.754	2.733	2.846
1/8	.125	5.508	5.465	5.692
3/16	.1875	8.262	8.198	8.537
1/4	.250	11.02	10.93	11.38
5/16	.3125	13.77	13.66	14.23
3/8	.375	16.52	16.40	17.07
7/16	.4375	19.28	19.13	19.92
1/2	.500	22.03	21.86	22.77
9/16	.5625	24.79	24.59	25.61
5/8	.625	27.54	27.33	28.46
11/16	.6875	30.29	30.06	31.30
3/4	.750	33.05	32.79	34.15
13/16	.8125	35.80	35.52	37.00
7/8	.875	38.56	38.26	39.84
15/16	.9375	41.31	40.99	42.69
1	1.000	44.06	43.72	45.53
1 1/16	1.0625	46.82	46.45	48.38
1 1/8	1.125	49.57	49.19	51.22
1 3/16	1.1875	52.33	51.92	54.07
1 1/4	1.250	55.08	54.65	56.92
1 5/16	1.3125	57.83	57.38	59.76
1 3/8	1.375	60.59	60.12	62.61
1 7/16	1.4375	63.34	62.85	65.45
1 1/2	1.500	66.10	65.58	68.30
1 9/16	1.5625	68.85	68.31	71.15
1 5/8	1.625	71.60	71.05	73.99
1 11/16	1.6875	74.36	73.78	76.84
1 3/4	1.750	77.11	76.51	79.68
1 13/16	1.8125	79.87	79.24	82.53
1 7/8	1.875	82.62	81.98	85.37
1 15/16	1.9375	85.37	84.71	88.22
2	2.000	88.13	87.44	91.07

18 PER CENT NICKEL SILVER SHEETS

By Brown & Sharpe's Gauge

Rolled to weight

Wt. Ozs. Sq. Ft.	Thick. Dec. in.	Nearest Gauge
24	.03294+	20+
20	.0281 +	21—
18	.0252 +	22—
16	.0224 +	24+
14	.0196 +	25+
12	.01647+	26+
10	.01372+	28+

BRASS

Specific Gravity—8.469

Weight per cubic inch— .306 pound

Weight per cubic foot—528.7 pound

NICKEL SILVER

To determine the weight of Sheet Nickel Silver other than 18%, multiply above weights for Nickel Silver as follows:

For 10% by .9912 For 15% by .9862 For 30% by .9985

Sheet Metals

Muntz Metal, Naval Brass, Tobin Bronze, Manganese Bronze

Weights per Square Foot

Thickness in Inches

Thickness Inches	Thickness Decimal Equivalents	Pounds per Square Foot Muntz Metal Naval Brass Tobin Bronze Manganese Bronze
1/32	.03125	1.367
1/16	.0625	2.733
1/8	.125	5.465
3/16	.1875	8.198
1/4	.250	10.93
5/16	.3125	13.66
3/8	.375	16.40
7/16	.4375	19.13
1/2	.500	21.86
9/16	.5625	24.59
5/8	.625	27.33
11/16	.6875	30.06
3/4	.750	32.79
13/16	.8125	35.52
7/8	.875	38.26
15/16	.9375	40.99
1	1.0000	43.72
1 1/16	1.0625	46.45
1 1/8	1.125	49.19
1 3/16	1.1875	51.92
1 1/4	1.250	54.65
1 5/16	1.3125	57.38
1 3/8	1.375	60.12
1 7/16	1.4375	62.85
1 1/2	1.500	65.58
1 9/16	1.5625	68.31
1 5/8	1.625	71.05
1 11/16	1.6875	73.78
1 3/4	1.750	76.51
1 13/16	1.8125	79.24
1 7/8	1.875	81.98
1 15/16	1.9375	84.71
2	2.0000	87.44

Brown & Sharpe's Gauge

Gauge No.	Thickness Decimal Equivalents	Pounds per Square Foot Muntz Metal Naval Brass Tobin Bronze Manganese Bronze
4/0	.460	20.24
3/0	.409	18.00
2/0	.364	16.02
0	.324	14.26
1	.289	12.72
2	.257	11.31
3	.229	10.08
4	.204	8.98
5	.182	8.01
6	.162	7.13
7	.144	6.34
8	.128	5.63
9	.114	5.04
10	.102	4.49
11	.090	3.96
12	.081	3.56
13	.072	3.17
14	.064	2.82
15	.057	2.51
16	.051	2.24
17	.045	1.98
18	.040	1.76
19	.036	1.58
20	.032	1.41
21	.028	1.23
22	.025	1.10
23	.0225	.99
24	.020	.88
25	.018	.79
26	.016	.70
27	.014	.62
28	.0126	.55
29	.011	.47
30	.010	.44
31	.0089	.39
32	.0079	.35

Stubs' Gauge

Gauge No.	Thickness Decimal Equivalents	Pounds per Square Foot Muntz Metal Naval Brass Tobin Bronze Manganese Bronze
4/0	.454	-------
3/0	.425	18.70
2/0	.380	16.75
0	.340	14.96
1	.300	13.20
2	.284	12.50
3	.259	11.40
4	.238	10.54
5	.220	9.70
6	.203	8.90
7	.180	7.92
8	.165	7.26
9	.148	6.51
10	.134	5.90
11	.120	5.28
12	.109	4.80
13	.095	4.18
14	.083	3.65
15	.072	3.16
16	.065	2.86
17	.058	2.55
18	.049	2.16
19	.042	1.85
20	.035	1.54
21	.032	1.41
22	.028	1.23
23	.025	1.10
24	.022	.97
25	.020	.88
26	.018	.79
27	.016	.70
28	.014	.615
29	.013	.57
30	.012	.53
31	.010	.44
32	.009	.39
33	.008	.35
34	.007	.31
35	.005	.22

Approximate Weights of
PHOSPHOR BRONZE SHEETS
By Brown & Sharpe's Gauge

No. of Gauge	Thickness Decimal Inch	Weight Pounds Sq. Ft.	No. of Gauge	Thickness Decimal Inch	Weight Pounds Sq. Ft.
0000	.46000	20.838	19	.035890	1.6258
000	.40964	18.557	20	.031961	1.4478
00	.36480	16.525	21	.028462	1.2893
0	.32486	14.716	22	.025347	1.1482
1	.28930	13.105	23	.022571	1.0225
2	.25763	11.671	24	.020100	.91053
3	.22942	10.393	25	.017900	.81087
4	.20431	9.2552	26	.01594	.72208
5	.18194	8.2419	27	.014195	.64303
6	.16202	7.3395	28	.012641	.57264
7	.14428	6.5359	29	.011257	.50994
8	.12849	5.8206	30	.010025	.45413
9	.11443	5.1837	31	.008928	.40444
10	.10189	4.6156	32	.007950	.36014
11	.090742	4.1196	33	.007080	.32072
12	.080808	3.6606	34	.006304	.28557
13	.071961	3.2598	35	.005614	.25431
14	.064084	2.9030	36	.005000	.2265
15	.057068	2.5852	37	.004453	.20172
16	.050820	2.3021	38	.003965	.18961
17	.045257	2.0501	39	.003531	.15995
18	.040303	1.8257	40	.003144	.14242

Approximate Weight of
SHEET ALUMINUM
By Brown & Sharpe's Gauge

Gauge No.	Dec. Inch	Wt. Lbs. Sq. Ft.	Gauge No.	Dec. Inch	Wt. Lbs. Sq. Ft.
4/0	.4600	6.394	20	.032	.450
3/0	.4096	5.694	21	.02846	.396
2/0	.3648	5.070	22	.0253	.357
0	.3249	4.516	23	.02257	.314
1	.2893	4.021	24	.0201	.283
2	.2576	3.581	25	.01790	.249
3	.2294	3.189	26	.0159	.225
4	.2043	2.840	27	.01420	.197
5	.1819	2.529	28	.0128	.178
6	.1620	2.252	29	.01126	.156
7	.1443	2.006	30	.0100	.147
8	.1285	1.786	31	.008928	.124
9	.1144	1.591	32	.008	.113
10	.1019	1.44	33	.007080	.098
11	.09074	1.261	34	.006304	.088
12	.0808	1.14	35	.005614	.078
13	.07196	1.000	36	.005000	.069
14	.0641	.903	37	.004453	.062
15	.05707	.793	38	.003965	.055
16	.0508	.716	39	.003531	.049
17	.04526	.629	40	.003144	.044
18	.0403	.568	1 inch thick,		13.9
19	.03589	.499	Weight per cubic inch		.0965

APPROXIMATE WEIGHTS OF

Sheet and Strip Brass

Brown and Sharpe's Gauge — Pounds per Lineal Foot

Gauge No.	Decimal inch	Width in Inches 3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
6	.16202		.14872	.18590	.22308	.26026	.29744	.33462	.37180	.40898	.44616
7	.14428		.13244	.16555	.19866	.23177	.26487	.29798	.33109	.36420	.39731
8	.12849		.11794	.14743	.17692	.20640	.23589	.26537	.29486	.32434	.35383
9	.11443		.10504	.13130	.15756	.18382	.21007	.23633	.26259	.28885	.31511
10	.10189	.07015	.09353	.11691	.14029	.16367	.18705	.21044	.23382	.25720	.28058
11	.090742	.06247	.08329	.10412	.12494	.14576	.16659	.18741	.20823	.22906	.24988
12	.080808	.05563	.07418	.09272	.11126	.12981	.14835	.16689	.18544	.20398	.22253
13	.071961	.04954	.06605	.08257	.09908	.11560	.13211	.14862	.16514	.18165	.19816
14	.064084	.04412	.05882	.07353	.08824	.10294	.11765	.13235	.14706	.16177	.17647
15	.057068	.03929	.05238	.06548	.07858	.09167	.10477	.11786	.13096	.14406	.15715
16	.05082	.03499	.04665	.05831	.06997	.08164	.09330	.10496	.11662	.12828	.13995
17	.045257	.03116	.04154	.05193	.06231	.07270	.08308	.09347	.10386	.11424	.12463
18	.040303	.02775	.03700	.04624	.05549	.06474	.07399	.08324	.09249	.10174	.11098
19	.03589	.02471	.03294	.04118	.04942	.05765	.06589	.07412	.08236	.09060	.09883
20	.031961	.02200	.02934	.03667	.04401	.05134	.05868	.06601	.07334	.08068	.08801
21	.028462	.01959	.02613	.03266	.03919	.04572	.05225	.05878	.06531	.07185	.07838
22	.025347	.01745	.02327	.02908	.03490	.04072	.04653	.05235	.05817	.06398	.06980
23	.022571	.01554	.02072	.02590	.03108	.03626	.04144	.04662	.05180	.05698	.06216
24	.0201	.01384	.01845	.02306	.02768	.03229	.03690	.04151	.04613	.05074	.05535
25	.0179	.01232	.01643	.02054	.02465	.02875	.03286	.03697	.04108	.04519	.04929
26	.01594	.01097	.01463	.01829	.02195	.02561	.02926	.03292	.03658	.04024	.04390
27	.014195	.00977	.01303	.01629	.01955	.02280	.02606	.02932	.03258	.03583	.03909
28	.012641	.00870	.01160	.01450	.01741	.02031	.02321	.02611	.02901	.03191	.03481
29	.011257	.00775	.01033	.01292	.01550	.01808	.02067	.02325	.02583	.02842	.03100
30	.010025	.00690	.00920	.01150	.01380	.01610	.01840	.02071	.02301	.02531	.02761
31	.008928	.00615	.00820	.01024	.01229	.01434	.01639	.01844	.02049	.02254	.02459
32	.00795	.00547	.00730	.00912	.01095	.01277	.01460	.01642	.01824	.02007	.02189
33	.00798	.00487	.00650	.00812	.00975	.01137	.01300	.01462	.01625	.01787	.01950
34	.006304	.00434	.00579	.00723	.00868	.01013	.01157	.01302	.01447	.01591	.01736
35	.005614	.00387	.00515	.00644	.00773	.00902	.01031	.01160	.01288	.01417	.01546
36	.005	.00344	.00459	.00574	.00688	.00803	.00918	.01033	.01147	.01262	.01377
37	.004453	.00307	.00409	.00511	.00613	.00715	.00818	.00920	.01022	.01124	.01226
38	.003965	.00273	.00364	.00455	.00546	.00637	.00728	.00819	.00910	.01001	.01092
39	.003531	.00243	.00324	.00405	.00486	.00567	.00648	.00729	.00810	.00891	.00972
40	.003144	.00217	.00289	.00361	.00433	.00505	.00577	.00649	.00722	.00794	.00866

Gauge No.	Decimal Inch	Width in Inches 13/16	7/8	15/16	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4
6	.16202	.48334	.52052	.55770	.59488	.66924	.74360	.81797	.89233	.96669	1.04105
7	.14428	.43042	.46353	.49664	.52975	.59597	.66219	.72840	.79462	.86084	.92706
8	.12849	.38332	.41280	.44229	.47177	.53074	.58972	.64869	.70766	.76663	.82560
9	.11443	.34137	.36763	.39389	.42015	.47267	.52519	.57770	.63022	.68274	.73526
10	.10189	.30396	.32734	.35072	.37411	.42087	.46763	.51440	.56116	.60792	.65469
11	.090742	.27074	.29153	.31235	.33317	.37482	.41647	.45812	.49976	.54141	.58306
12	.080808	.24107	.25961	.27816	.29670	.33379	.37088	.40796	.44505	.48214	.51923
13	.071961	.21468	.23119	.24770	.26422	.29724	.33027	.36330	.39633	.42935	.46238
14	.064084	.19118	.20588	.22059	.23530	.26471	.29412	.32353	.35294	.38236	.41177
15	.057068	.17025	.18334	.19644	.20954	.23573	.26192	.28811	.31430	.34049	.36669
16	.05082	.15161	.16327	.17493	.18659	.20992	.23324	.25657	.27989	.30322	.32654
17	.045257	.13501	.14540	.15578	.16617	.18694	.20771	.22848	.24925	.27002	.29080
18	.040303	.12023	.12948	.13873	.14798	.16648	.18497	.20347	.22197	.24047	.25896
19	.03589	.10707	.11530	.12354	.13178	.14825	.16472	.18119	.19766	.21414	.23061
20	.031961	.09535	.10268	.11002	.11735	.13202	.14669	.16136	.17603	.19069	.20536
21	.028462	.08491	.09144	.09797	.19450	.11757	.13063	.14369	.15676	.16982	.18288
22	.025347	.07562	.08143	.08725	.09307	.10470	.11633	.12797	.13960	.15123	.16287
23	.022571	.06734	.07251	.07769	.08287	.09323	.10359	.11395	.12431	.13467	.14503
24	.0201	.05996	.06458	.06919	.07380	.08303	.09225	.10148	.11070	.11993	.12915
25	.0179	.05340	.05751	.06162	.06572	.07394	.08215	.09037	.09858	.10680	.11502
26	.01594	.04755	.05121	.05487	.05853	.06584	.07316	.08047	.08779	.09511	.10242
27	.014195	.04235	.04560	.04886	.05212	.05863	.06515	.07166	.07818	.08469	.09121
28	.012641	.03771	.04061	.04351	.04641	.05222	.05802	.06382	.06962	.07542	.08122
29	.011257	.03358	.03617	.03875	.04133	.04650	.05167	.05683	.06200	.06716	.07233
30	.010025	.02991	.03221	.03451	.03681	.04141	.04601	.05061	.05521	.05981	.06442
31	.008928	.02663	.02868	.03073	.03278	.03689	.04098	.04507	.04917	.05327	.05737
32	.00795	.02372	.02554	.02737	.02919	.03284	.03649	.04014	.04379	.04743	.05108
33	.00708	.02112	.02275	.02437	.02600	.02925	.03249	.03574	.03899	.04224	.04549
34	.006304	.01881	.02025	.02170	.02315	.02604	.02893	.03183	.03472	.03761	.04051
35	.005614	.01675	.01804	.01932	.02061	.02319	.02577	.02834	.03092	.03350	.03607
36	.005	.01492	.01606	.01721	.01836	.02065	.02295	.02524	.02754	.02983	.03213
37	.004453	.01328	.01431	.01533	.01635	.01839	.02044	.02248	.02453	.02657	.02861
38	.003965	.01183	.01274	.01365	.01456	.01638	.01820	.02002	.02184	.02366	.02548
39	.003531	.01053	.01134	.01215	.01297	.01459	.01621	.01783	.01945	.02107	.02269
40	.003144	.00938	.01010	.01082	.01154	.01299	.01443	.01587	.01732	.01876	.02020

Specific gravity at 4 deg. Centigrade, 8.469: 528.7 lbs. per cubic foot; .3060 lbs. per cubic inch.

APPROXIMATE WEIGHTS OF

Sheet and Strip Brass

Brown and Sharpe's Gauge — Pounds per Lineal Foot

Gauge No.	Decimal inch	Widths in Inches 1⅞	2	2¼	2½	2¾	3	3¼	3½	3¾	4
6	.16202	1.11541	1.18977	1.33849	1.48721	1.63593	1.78465	1.93337	2.08209	2.23081	2.37953
7	.14428	.99328	1.05950	1.19193	1.32437	1.45681	1.58924	1.72168	1.85412	1.98656	2.11899
8	.12849	.88457	.94355	1.06149	1.17943	1.29737	1.41532	1.53326	1.65120	1.76915	1.88709
9	.11443	.78778	.84030	.94534	1.05037	1.15541	1.26045	1.36548	1.47052	1.57556	1.68060
10	.10189	.70145	.74821	.84174	.93527	1.02879	1.12232	1.21585	1.30937	1.40290	1.49643
11	.090742	.62470	.66635	.74964	.83294	.91623	.99952	1.08282	1.16611	1.24940	1.33270
12	.080808	.55631	.59340	.66758	.74175	.81593	.90010	.96428	1.03845	1.11263	1.18680
13	.071961	.49541	.52843	.59449	.66054	.72660	.79265	.85871	.92476	.99081	1.05687
14	.064084	.44118	.47059	.52941	.58824	.64706	.70589	.76471	.82553	.88236	.94118
15	.057068	.39288	.41907	.47145	.52384	.57622	.62860	.68099	.73337	.78576	.83814
16	.05082	.34986	.37319	.41984	.46649	.51313	.55978	.60643	.65308	.69973	.74638
17	.045257	.31157	.33234	.37388	.41542	.45696	.49851	.54005	.58159	.62313	.66468
18	.040303	.27746	.29596	.33295	.36995	.40694	.44394	.48093	.51793	.55492	.59192
19	.03589	.24708	.26355	.29650	.32944	.36238	.39533	.42827	.46122	.49416	.52710
20	.031961	.22003	.23470	.26404	.29338	.32271	.35205	.38139	.41073	.44006	.46940
21	.028462	.19594	.20901	.23513	.26126	.28738	.31351	.33964	.36576	.39189	.41801
22	.025347	.17450	.18613	.20940	.23266	.25593	.27920	.30246	.32573	.34900	.37226
23	.022571	.15539	.16575	.18647	.20718	.22790	.24862	.26934	.29006	.31078	.33149
24	.0201	.13838	.14760	.16605	.18450	.20295	.22140	.23985	.25830	.27675	.29520
25	.0179	.12323	.13145	.14788	.16431	.18074	.19717	.21360	.23003	.24646	.26289
26	.01594	.10974	.11705	.13168	.14632	.16095	.17558	.19021	.20484	.21947	.23411
27	.014195	.09772	.10424	.11727	.13030	.14333	.15636	.16939	.18242	.19545	.20848
28	.012641	.08703	.09283	.10443	.11603	.12764	.13924	.15084	.16245	.17405	.18565
29	.011257	.07750	.08266	.09300	.10333	.11366	.12400	.13423	.14466	.15500	.16533
30	.010025	.06902	.07362	.08282	.09202	.10122	.11043	.11963	.12883	.13803	.14723
31	.008928	.06146	.06556	.07376	.08195	.09015	.09834	.10654	.11473	.12293	.13112
32	.00795	.05473	.05838	.06568	.07297	.08027	.08757	.09487	.10216	.10946	.11676
33	.00708	.04874	.05199	.05849	.06499	.07149	.07799	.08449	.09098	.09748	.10398
34	.006304	.04340	.04629	.05208	.05787	.06365	.06944	.07523	.08101	.08680	.09259
35	.005614	.03865	.04123	.04638	.05153	.05669	.06184	.06699	.07215	.07730	.08245
36	.005	.03442	.03672	.04131	.04590	.05049	.05508	.05967	.06425	.06884	.07343
37	.004453	.03066	.03270	.03679	.04088	.04496	.04905	.05314	.05723	.06131	.06540
38	.003965	.02730	.02912	.03278	.03640	.04004	.04368	.04731	.05095	.05459	.05823
39	.003531	.02431	.02593	.02917	.03241	.03565	.03889	.04214	.04538	.04862	.05186
40	.003144	.02165	.02309	.02597	.02886	.03175	.03463	.03752	.04040	.04329	.04618

Gauge No.	Decimal inch	Widths in Inches 4½	5	5½	6	7	8	9	10	11	12
6	.16202	2.67698	2.97442	3.27186	3.56930	4.16418	4.75907	5.35395	5.94883	6.54372	7.13860
7	.14428	2.38387	2.64874	2.91361	3.17849	3.70082	4.23799	4.76773	5.29748	5.82723	6.35698
8	.12849	2.12298	2.35886	2.59475	2.83065	3.30241	3.77418	4.24595	4.71773	5.18950	5.66127
9	.11443	1.89067	2.10074	2.31082	2.52089	2.94104	3.36119	3.78134	4.20149	4.62164	5.04179
10	.10189	1.68348	1.87053	2.05758	2.24464	2.61874	2.99285	3.36696	3.74106	4.11517	4.48927
11	.090742	1.49929	1.66587	1.83246	1.99905	2.33222	2.66540	2.99857	3.33174	3.66492	3.99809
12	.080808	1.33515	1.48350	1.63185	1.78020	2.07690	2.37360	2.67030	2.96700	3.26370	3.56040
13	.071961	1.18898	1.32108	1.45319	1.58530	1.84952	2.11374	2.37795	2.64217	2.90639	3.17060
14	.064084	1.05883	1.17648	1.29412	1.41177	1.64707	1.88236	2.11766	2.35295	2.58825	2.82354
15	.057068	.94291	1.04767	1.15244	1.25721	1.46674	1.67628	1.88581	2.09535	2.30488	2.51442
16	.05082	.83967	.93297	1.02627	1.11957	1.30616	1.49275	1.67935	1.86594	2.05254	2.23913
17	.045257	.74776	.83084	.91393	.99701	1.16318	1.32935	1.49552	1.66169	1.82786	1.99402
18	.040303	.66591	.73990	.81389	.88788	1.03585	1.18383	1.33181	1.47979	1.62777	1.77575
19	.03589	.59299	.65888	.72477	.79066	.92243	1.05421	1.18560	1.31776	1.44954	1.58131
20	.031961	.52808	.58675	.64543	.70410	.82145	.93880	1.05615	1.17350	1.29085	1.40820
21	.028462	.47026	.52251	.57477	.62701	.73152	.83602	.94053	1.04503	1.14953	1.25404
22	.025347	.41880	.46533	.51186	.55839	.65146	.74453	.83759	.93066	1.02372	1.11679
23	.022571	.37293	.41437	.45580	.49724	.58011	.66299	.74586	.82873	.91161	.99448
24	.0201	.33210	.36900	.40590	.44280	.51660	.59040	.66421	.73801	.81181	.88561
25	.0179	.29575	.32861	.36148	.39434	.46006	.52578	.59151	.65723	.72295	.78867
26	.01594	.26337	.29263	.32190	.35116	.40969	.46821	.52674	.58526	.64379	.70232
27	.014195	.23454	.26060	.28666	.31272	.36484	.41696	.46907	.52119	.57331	.62543
28	.012641	.20886	.23207	.25528	.27848	.32490	.37131	.41772	.46414	.51055	.55696
29	.011257	.18599	.20666	.22733	.24799	.28932	.33066	.37199	.41332	.45465	.49598
30	.010025	.16564	.18404	.20245	.22085	.25766	.29447	.33128	.36809	.40489	.44170
31	.008928	.14751	.16390	.18029	.19668	.22947	.26225	.29503	.32781	.36059	.39337
32	.00795	.13135	.14595	.16054	.17514	.20433	.23351	.26271	.29190	.32109	.35028
33	.00708	.11698	.12998	.14298	.15597	.18197	.20796	.23396	.25995	.28595	.31195
34	.006304	.10416	.11573	.12730	.13888	.16202	.18517	.20832	.23146	.25461	.27775
35	.005614	.09276	.10306	.11337	.12368	.14429	.16490	.18552	.20613	.22674	.24735
36	.005	.08261	.09179	.10097	.11015	.12851	.14687	.16523	.18358	.20194	.22030
37	.004453	.07358	.08175	.08993	.09810						
38	.003965	.06551	.07279	.08007	.08735						
39	.003531	.05834	.06482	.07131	.07779						
40	.003144	.05195	.05772	.06349	.06926						

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APPROXIMATE WEIGHTS OF
Sheet Copper

Thick. Fract. Inch	Decimal Inch	Gauge Numbers Stubs'	B.&S.	U.S.S.	Decimal Pounds Sq. Ft.	Fract. Pounds Sq. Ft.	Weight Ounces Sq. Ft.
	.00134989	.....	.....	.....	.0625	1/16	1.00
	.00269978	.....	.....	.....	.1250	1/8	2.00
	.004	36	.....	.....	.1852	.....	2.963
	.00404968	.....	.....	.....	.1875	3/16	3.00
	.00453	.....	37	.....	.2062	.....	3.299
	.005	35	36	.....	.2315	.....	3.704
	.00539957	.....	.....	.....	.2500	1/4	4.00
	.005614	.....	35	.....	.2599	.....	4.159
	.00674946	.....	.....	.....	.3125	5/16	5.00
	.007	34	.....	.....	.3241	.....	5.186
	.00708	.....	33	.....	.3278	.....	5.245
	.008	33	.....	.....	.3704	.....	5.926
	.00809935	.....	.....	.....	.3750	3/8	6.00
	.008928	.....	31	.....	.4134	.....	6.614
	.009	32	.....	.....	.4167	.....	6.667
	.00944924	.....	.....	.....	.4375	7/16	7.00
	.010	31	.....	.....	.4630	.....	7.408
	.010025	.....	30	.....	.4642	.....	7.427
	.01079914	.....	.....	.....	.5000	1/2	8.00
	.011257	.....	29	.....	.5212	.....	8.339
	.012	30	.....	.....	.5556	.....	8.890
	.0121490	.....	.....	.....	.5625	9/16	9.00
	.012641	.....	28	.....	.5853	.....	9.364
	.013	29	.....	.....	.6019	.....	9.630
	.0134989	.....	.....	.....	.625	5/8	10.00
	.014	28	.....	.....	.6482	.....	10.371
	.014195	.....	27	.....	.6572	.....	10.516
	.0148488	.....	.....	.....	.6875	11/16	11.00
1/64	.015625	.....	.....	28	.7234	.....	11.575
	.01594	.....	26	.....	.7380	.....	11.808
	.016	27	.....	.....	.7408	.....	11.853
	.0161987	.....	.....	.....	.750	3/4	12.00
	.0175486	.....	.....	.....	.8125	13/16	13.00
	.0179	.....	25	.....	.8288	.....	13.260
	.018	26	.....	.....	.8334	.....	13.334
	.01875	.....	.....	26	.8681	.....	13.890
	.0188985	.....	.....	.....	.875	7/8	14.00
	.020	25	.....	.....	.9260	.....	14.816
	.0201	.....	24	.....	.9306	.....	14.890
	.0202484	.....	.....	.....	.9375	15/16	15.00
	.0215983	.....	.....	.....	1.00	.....	16.00
	.022	24	.....	.....	1.0186	.....	16.298
	.022571	.....	23	.....	1.0450	.....	16.721
	.0229482	.....	.....	.....	1.0625	1 1/16	17.00
	.0242981	.....	.....	.....	1.125	1 1/8	18.00
	.025	23	.....	24	1.1575	.....	18.520
	.025347	.....	22	.....	1.1736	.....	18.777
	.0256479	.....	.....	.....	1.1875	1 3/16	19.00
	.0259179	.....	.....	.....	1.20	.....	19.20
	.0269978	.....	.....	.....	1.25	1 1/4	20.00
	.028	22	.....	.....	1.2964	.....	20.742
	.0283477	.....	.....	.....	1.3125	1 5/16	21.00
	.028462	.....	21	.....	1.318	.....	21.085
	.0296976	.....	.....	.....	1.375	1 3/8	22.00
	.0310475	.....	.....	.....	1.438	1 7/16	23.00
1/32	.03125	.....	.....	22	1.447	.....	23.15
	.031961	.....	20	.....	1.480	.....	23.677
	.032	21	.....	.....	1.482	.....	23.706
	.0323974	.....	.....	.....	1.500	1 1/2	24.00
	.0337473	.....	.....	.....	1.563	1 9/16	25.00
	.0345572	.....	.....	.....	1.60	.....	25.60
	.035	20	.....	.....	1.621	.....	25.928
	.0350972	.....	.....	.....	1.625	1 5/8	26.00
	.03589	.....	19	.....	1.662	.....	26.587
	.0364471	.....	.....	.....	1.688	1 11/16	27.00
	.0375	.....	.....	20	1.736	.....	27.780
	.0377970	.....	.....	.....	1.75	1 3/4	28.00
	.0391469	.....	.....	.....	1.813	1 13/16	29.00
	.040303	.....	18	.....	1.866	.....	29.856
	.0404968	.....	.....	.....	1.875	1 7/8	30.00
	.0418467	.....	.....	.....	1.938	1 15/16	31.00
	.042	19	.....	.....	1.945	.....	31.114
	.0431965	.....	.....	.....	2.00	.....	32.00
	.045257	.....	17	.....	2.095	.....	33.526
	.0458963	.....	.....	.....	2.125	2 1/8	34.00
3/64	.046875	.....	.....	.....	2.170	.....	34.725
	.0485961	.....	.....	.....	2.25	2 1/4	36.00
	.049	18	.....	.....	2.269	.....	36.299
	.05082	.....	16	.....	2.353	.....	37.647
	.0512959	.....	.....	.....	2.375	2 3/8	38.00
	.0518359	.....	.....	.....	2.40	.....	38.40
	.0539957	.....	.....	.....	2.50	2 1/2	40.00
	.0566955	.....	.....	.....	2.625	2 5/8	42.00
	.057068	.....	15	.....	2.642	.....	42.276
	.058	17	.....	.....	2.685	.....	42.966
	.0593952	.....	.....	.....	2.75	2 3/4	44.00
	.0604752	.....	.....	.....	2.80	.....	44.80
	.062095	.....	.....	.....	2.875	2 7/8	46.00
1/16	.0625	.....	.....	16	2.894	.....	46.30
	.064084	.....	14	.....	2.967	.....	47.473
	.064795	.....	.....	.....	3.00	.....	48.00
	.055	16	.....	.....	3.010	.....	48.152
	.067495	.....	.....	.....	3.125	3 1/8	50.00
	.070194	.....	.....	.....	3.25	3 1/4	52.00
	.071961	.....	13	.....	3.332	.....	53.309
	.072	15	.....	.....	3.334	.....	53.338
	.072894	.....	.....	.....	3.375	3 3/8	54.00
	.075594	.....	.....	.....	3.50	3 1/2	56.00
	.077754	.....	.....	.....	3.60	.....	57.60
5/64	.078125	.....	.....	14	3.617	.....	57.875
	.078294	.....	.....	.....	3.625	3 5/8	58.00
	.080808	.....	12	.....	3.741	.....	59.863
	.080994	.....	.....	.....	3.75	3 3/4	60.00
	.083	14	.....	.....	3.843	.....	61.486
	.083693	.....	.....	.....	3.875	3 7/8	62.00
	.086393	.....	.....	.....	4.00	.....	64.00
	.090742	.....	11	.....	4.201	.....	67.222
	.091793	.....	.....	.....	4.25	4 1/4	68.00
3/32	.09375	.....	.....	13	4.341	.....	69.450
	.095	13	.....	.....	4.399	.....	70.376
	.095032	.....	.....	.....	4.40	.....	70.40
	.097192	.....	.....	.....	4.50	4 1/2	72.00
	.10189	.....	10	.....	4.718	.....	75.480
	.102592	.....	.....	.....	4.750	4 3/4	76.00
	.103672	.....	.....	.....	4.800	.....	76.800
	.107991	.....	.....	.....	5.000	.....	80.000
	.109	12	.....	.....	5.047	.....	80.747
7/64	.109375	.....	.....	12	5.064	.....	81.025
	.112311	.....	.....	.....	5.20	.....	83.200
	.113391	.....	.....	.....	5.250	5 1/4	84.000
	.11443	.....	9	.....	5.298	.....	84.770
	.118790	.....	.....	.....	5.500	5 1/2	88.000
	.120	11	.....	.....	5.556	.....	88.896
	.120950	.....	.....	.....	5.600	.....	89.600
	.124190	.....	.....	.....	5.750	5 3/4	92.000
1/8	.125	.....	.....	11	5.788	.....	92.600
	.12849	.....	8	.....	5.949	.....	95.185
	.129590	.....	.....	.....	6.000	.....	96.000
	.134	10	.....	.....	6.204	.....	99.267
	.134989	.....	.....	.....	6.250	6 1/4	100.000
	.140389	.....	.....	.....	6.500	6 1/2	104.000
9/64	.140625	.....	.....	10	6.511	.....	104.175
	.14428	.....	7	.....	6.680	.....	106.883
	.148	9	.....	.....	6.852	.....	109.638
	.151188	.....	.....	.....	7.000	.....	112.000
5/32	.15625	.....	.....	9	7.234	.....	115.750
	.161987	.....	.....	.....	7.500	7 1/2	120.000
	.16202	.....	6	.....	7.502	.....	120.025
	.165	8	.....	.....	7.640	.....	122.232
11/64	.171875	.....	.....	8	7.958	.....	127.325
	.172786	.....	.....	.....	8.000	.....	128.000
	.180	7	.....	.....	8.334	.....	133.334
	.18194	.....	5	.....	8.424	.....	134.781
	.18385	.....	.....	.....	8.500	8 1/2	136.000
3/16	.1875	.....	.....	7	8.681	.....	138.900
	.194384	.....	.....	.....	9.000	.....	144.000
	.203	6	.....	.....	9.399	.....	150.382
13/64	.203125	.....	.....	6	9.405	.....	150.475
	.20431	.....	4	.....	9.460	.....	151.353
	.205184	.....	.....	.....	9.500	9 1/2	152.000
	.215983	.....	.....	.....	10.000	.....	160.000
7/32	.21875	.....	.....	5	10.128	.....	162.050
	.220	5	.....	.....	10.186	.....	162.976
	.22942	.....	3	.....	10.622	.....	169.954
15/64	.234375	.....	.....	4	10.852	.....	173.625
	.237581	.....	.....	.....	11.000	.....	176.000
	.238	4	.....	.....	11.019	.....	176.310
1/4	.250	.....	.....	3	11.575	.....	185.200
	.25763	.....	2	.....	11.928	.....	190.852
	.259	3	.....	.....	11.992	.....	191.867
	.259179	.....	.....	.....	12.000	.....	192.000
17/64	.265625	.....	.....	2	12.298	.....	196.775
	.280778	.....	.....	.....	13.000	.....	208.000
9/32	.28125	.....	.....	1	13.02	.....	208.35
	.284	2	.....	.....	13.15	.....	210.39
	.2893	.....	1	.....	13.39	.....	214.31
	.300	1	.....	.....	13.89	.....	222.24
	.302376	.....	.....	.....	14.00	.....	224.00
5/16	.3125	.....	.....	0	14.47	.....	231.50
	.323974	.....	.....	.....	15.00	.....	240.00
	.32486	.....	0	.....	15.04	.....	240.66
	.340	0	.....	.....	15.74	.....	251.87
11/32	.34375	.....	.....	2/0	15.92	.....	254.65
	.345572	.....	.....	.....	16.00	.....	256.00
	.3648	.....	2/0	.....	16.89	.....	270.24
	.367171	.....	.....	.....	17.00	.....	272.00
3/8	.375	.....	.....	3/0	17.36	.....	277.80
	.380	2/0	.....	.....	17.59	.....	281.50
	.388769	.....	.....	.....	18.00	.....	288.00
13/32	.40625	.....	.....	4/0	18.81	.....	300.95
	.40964	.....	3/0	.....	18.97	.....	303.46
	.410367	.....	.....	.....	19.00	.....	304.00
	.425	3/0	.....	.....	19.68	.....	314.84
	.431965	.....	.....	.....	20.00	.....	320.00
7/16	.4375	.....	.....	5/0	20.26	.....	324.10
	.453564	.....	.....	.....	21.00	.....	336.00
	.454	4/0	.....	.....	21.02	.....	336.32
	.460	.....	4/0	.....	21.30	.....	340.77
15/32	.46875	.....	.....	6/0	21.70	.....	347.25
	.475162	.....	.....	.....	22.00	.....	352.00
	.496760	.....	.....	.....	23.00	.....	368.00
1/2	.500	.....	.....	7/0	23.15	.....	370.40
	.518359	.....	.....	.....	24.00	.....	384.00
	.539957	.....	.....	.....	25.00	.....	400.00
9/16	.56250	.....	.....	.....	26.04	.....	416.70
5/8	.62500	.....	.....	.....	28.94	.....	463.00
11/16	.68750	.....	.....	.....	31.83	.....	509.30
3/4	.75000	.....	.....	.....	34.73	.....	555.60
13/16	.81250	.....	.....	.....	37.62	.....	601.90
7/8	.87500	.....	.....	.....	40.51	.....	648.20
15/16	.93750	.....	.....	.....	43.41	.....	694.50
1	1.00000	.....	.....	.....	46.30	.....	740.80

Computation based on .32152 pounds per Cubic Inch.

Sheet Copper

WEIGHTS PER SQUARE FOOT

THICKNESS WHEN ROLLED TO WEIGHT

Wt. per Sq. Ft. Ounces	Wt. per Sq. Ft. Pounds	Thickness Inches	Nearest Gauge No. B. & S.	Nearest Gauge No. Stubs	Nearest Fraction Inches
....	16	.3456	00	00	11/32
....	15	.3240	0	0	21/64+
....	14	.3024	1	1	19/64—
....	13	.2808	1	2	9/32
....	12	.2592	2	3	1/4—
....	11	.2376	3	4	15/64—
....	10	.2160	4	5	7/32+
....	9½	.2052	4	6	13/64
....	9	.1944	4	6	
....	8½	.1836	5	7	3/16+
....	8	.1728	5	8	11/64
....	7½	.1620	6	8	
....	7	.1512	7	9	5/32+
....	6½	.1404	7	10	9/64
....	6	.1296	8	10	1/8—
88	5½	.1188	9	11	
80	5	.1080	10	12	7/64+
72	4½	.0972	10	13	3/32—
64	4	.0864	11	14	
56	3½	.0756	13	15	5/64+
48	3	.0648	14	16	1/16—
44	2¾	.0594	15	17	
40	2½	.0540	15	17	
36	2¼	.0486	16	18	3/64—
32	2	.0432	17	19	
28	1¾	.0378	19	20	
24	1½	.0324	20	21	1/32—
20	1¼	.0270	21	22	
18	1⅛	.0243	22	23	
16	1	.0216	23	24	
15	15/16	.0202	24	25	
14	7/8	.0189	25	26	
13	13/16	.0173	25	26	
12	3/4	.0162	26	27	1/64—
11	11/16	.0146	27	28	
10	5/8	.0135	27	29	
9	9/16	.0120	28	30	
8	1/2	.0108	29	31	
7	7/16	.0093	31	32	
6	3/8	.0081	32	33	
4	1/4	.0054	35	35	
2	1/8	.0027	....	....	

The + sign shows that the size is more than 1 per cent full.
The — sign shows that the size is more than 1 per cent scant.

B. & S. and STUBS GAUGES

Brown & Sharpe Gauge No.	Decimal Equivalent	Pounds per Sq. Ft.	Stubs Gauge No.	Decimal Equivalent	Pounds per Sq. Ft.	Inches and Fractions Thickness	Pounds per Sq. Ft.
4/0	.4600	21.30	4/0	.454	21.02	1/16	2.894
3/0	.4096	18.97	3/0	.425	19.68	1/8	5.788
2/0	.3648	16.89	2/0	.380	17.59	3/16	8.681
0	.3249	15.04	0	.340	15.74	1/4	11.58
1	.2893	13.39	1	.300	13.89	5/16	14.47
2	.2576	11.93	2	.284	13.15	3/8	17.36
3	.2294	10.62	3	.259	11.99	7/16	20.25
4	.2043	9.460	4	.238	11.02	1/2	23.15
5	.1819	8.424	5	.220	10.19	9/16	26.04
6	.1620	7.502	6	.203	9.399	5/8	28.94
7	.1443	6.681	7	.180	8.334	11/16	31.83
8	.1285	5.949	8	.165	7.639	3/4	34.73
9	.1144	5.298	9	.148	6.852	13/16	37.62
10	.1019	4.718	10	.134	6.204	7/8	40.51
11	.09074	4.201	11	.120	5.556	15/16	43.41
12	.08081	3.741	12	.109	5.047	1	46.30
13	.07196	3.332	13	.095	4.399	1 1/16	49.19
14	.06408	2.967	14	.083	3.843	1 1/8	52.09
15	.05707	2.642	15	.072	3.334	1 3/16	54.98
16	.05082	2.353	16	.065	3.009	1 1/4	57.88
17	.04526	2.096	17	.058	2.685	1 5/16	60.77
18	.04030	1.866	18	.049	2.269	1 3/8	63.66
19	.03589	1.662	19	.042	1.945	1 7/16	66.56
20	.03196	1.480	20	.035	1.621	1 1/2	69.45
21	.02846	1.318	21	.032	1.482	1 9/16	72.35
22	.02535	1.174	22	.028	1.296	1 5/8	75.24
23	.02257	1.045	23	.025	1.158	1 11/16	78.13
24	.02010	.9307	24	.022	1.019	1 3/4	81.03
25	.01790	.8288	25	.020	.9260	1 13/16	83.92
26	.01594	.7381	26	.018	.8334	1 7/8	86.81
27	.01420	.6573	27	.016	.7408	1 15/16	89.71
28	.01264	.5853	28	.014	.6482	2	92.60
29	.01126	.5212	29	.013	.6019		
30	.01003	.4642	30	.012	.5556		
31	.008928	.4134	31	.010	.4630		
32	.007950	.3681	32	.009	.4167		
33	.007080	.3278	33	.008	.3704		
34	.006305	.2919	34	.007	.3241		
35	.005615	.2600	35	.005	.2315		
36	.005000	.2315	36	.004	.1852		
37	.004453	.2062					
38	.003965	.1836					
39	.003531	.1635					
40	.003145	.1456					

Variations from these weights must be expected in practice.

Allegheny Stainless Steel Sheets

U. S. Standard Gauge

Approximate Weight per Square Foot

Gauge Number	Approximate Decimal Parts of an inch	*Average Wt. per Square Foot in pounds for Chrome Iron Alloys	**Average Wt. per Square Foot in pounds for Chrome Nickel—Cold Rolled Alloys
8	.171875	7.0813	7.2187
9	.15625	6.4375	6.5625
10	.140625	5.7937	5.9062
11	.125	5.15	5.2500
12	.109375	4.5063	4.5937
13	.09375	3.8625	3.9375
14	.078125	3.2187	3.2812
15	.0703125	2.8968	2.9531
16	.0625	2.575	2.6250
17	.05625	2.3175	2.3625
18	.050	2.06	2.1000
19	.04375	1.8025	1.8375
20	.0375	1.545	1.5750
21	.034375	1.416	1.4437
22	.03125	1.2875	1.3125
23	.028125	1.1587	1.1813
24	.025	1.03	1.0500
25	.021875	.9013	.9187
26	.01875	.7725	.7875
27	.0171875	.7081	.7218
28	.015625	.6438	.6562
29	.0140625	.5794	.5906
30	.0125	.515	.5250
31	.0109375	.4506	.4594
32	.01015625	.4184	.4265

*Governs weights of—Allegheny 33; Allegheny 46; Allegheny 55; Allegheny 66; Allegheny 67.
**Governs weights of—Allegheny Metal; Allegheny 44; Allegheny 22.

Use "Compton" Sheet Metal shears for best results in your shop.

APPROXIMATE WEIGHTS OF

Sheet and Strip Copper

Brown and Sharpe's Gauge.

Pounds per Lineal Foot

Gauge No.	Decimal Inch	Widths in Inches 3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
6	.16202	.....	.15628	.19535	.23442	.27349	.31256	.35163	.39070	.42978	.46885
7	.14428	.....	.13917	.17396	.20876	.24355	.27834	.31313	.34793	.38272	.41751
8	.12849	.....	.12394	.15492	.18591	.21689	.24788	.27886	.30985	.34083	.37182
9	.11443	.....	.11038	.13797	.16557	.19316	.22076	.24835	.27594	.30354	.33113
10	.10189	.07371	.09828	.12285	.14742	.17199	.19656	.22113	.24570	.27027	.29484
11	.090742	.06565	.08753	.10941	.13129	.15317	.17506	.19694	.21882	.24070	.26259
12	.080808	.05846	.07795	.09743	.11692	.13641	.15589	.17538	.19489	.21435	.23384
13	.071961	.05206	.06941	.08677	.10412	.12147	.13883	.15618	.17353	.19088	.20824
14	.064084	.04636	.06181	.07727	.09272	.10818	.12363	.13908	.15454	.16999	.18544
15	.057068	.04129	.05505	.06881	.08257	.09633	.11009	.12386	.13762	.15138	.16514
16	.05082	.03677	.04902	.06128	.07353	.08579	.09804	.11030	.12255	.13481	.14706
17	.045257	.03274	.04365	.05457	.06548	.07640	.08731	.09822	.10914	.12005	.13096
18	.040303	.02916	.03888	.04860	.05831	.06803	.07775	.08747	.09719	.10691	.11663
19	.03589	.02596	.03462	.04327	.05193	.06058	.06924	.07789	.08655	.09520	.10386
20	.031961	.02312	.03083	.03854	.04624	.05395	.06166	.06937	.07707	.08478	.09249
21	.028462	.02059	.02745	.03432	.04118	.04805	.05491	.06177	.06864	.07550	.08236
22	.025347	.01834	.02445	.03056	.03667	.04279	.04890	.05501	.06112	.06724	.07335
23	.022571	.01633	.02177	.02722	.03266	.03810	.04354	.04899	.05443	.05987	.06532
24	.0201	.01454	.01939	.02424	.02908	.03393	.03878	.04362	.04847	.05332	.05816
25	.0179	.01295	.01727	.02158	.02590	.03022	.03453	.03885	.04317	.04748	.05180
26	.01594	.01153	.01538	.01922	.02306	.02691	.03075	.03460	.03844	.04228	.04613
27	.014195	.01027	.01369	.01712	.02054	.02396	.02739	.03081	.03423	.03765	.04108
28	.012641	.00915	.01219	.01524	.01829	.02134	.02439	.02744	.03048	.03353	.03658
29	.011257	.00814	.01086	.01357	.01629	.01900	.02172	.02443	.02715	.02986	.03258
30	.010025	.00725	.00967	.01209	.01451	.01692	.01934	.02176	.02418	.02659	.02901
31	.008928	.00646	.00861	.01077	.01292	.01507	.01722	.01938	.02153	.02368	.02584
32	.00795	.00575	.00767	.00959	.01150	.01342	.01534	.01725	.01917	.02109	.02301
33	.00708	.00512	.00683	.00854	.01024	.01195	.01366	.01537	.01707	.01878	.02049
34	.006304	.00456	.00608	.00760	.00912	.01064	.01216	.01368	.01520	.01672	.01824
35	.005614	.00406	.00542	.00677	.00812	.00948	.01083	.01218	.01354	.01489	.01625
36	.005	.00362	.00482	.00603	.00723	.00844	.00965	.01085	.01206	.01326	.01447
37	.004453	.00322	.00430	.00537	.00644	.00752	.00859	.00966	.01074	.01181	.01289
38	.003965	.00287	.00383	.00478	.00574	.00669	.00765	.00861	.00956	.01052	.01147
39	.003531	.00256	.00341	.00426	.00511	.00596	.00681	.00766	.00852	.00937	.01022
40	.003144	.00227	.00303	.00379	.00455	.00531	.00607	.00682	.00758	.00834	.00910

Gauge No.	Decimal Inch	Widths in Inches 13/16	7/8	15/16	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4
6	.16202	.50792	.54699	.58606	.62513	.70327	.78141	.85955	.93769	1.01583	1.09397
7	.14428	.45230	.48710	.52189	.55668	.62627	.69585	.76544	.83502	.90461	.97419
8	.12849	.40280	.43379	.46477	.49576	.55773	.61970	.68167	.74364	.80561	.86758
9	.11443	.35873	.38632	.41392	.44151	.49670	.55189	.60708	.66226	.71745	.77264
10	.10189	.31942	.34399	.36856	.39313	.44227	.49141	.54055	.58969	.63883	.68797
11	.090742	.28447	.30635	.32823	.35011	.39380	.43764	.48141	.52517	.56893	.61270
12	.080808	.25333	.27281	.29230	.31178	.35076	.38973	.42870	.46768	.50665	.54562
13	.071961	.22559	.24294	.26030	.27765	.31236	.34706	.38177	.41647	.45118	.48589
14	.064084	.20090	.21635	.23180	.24726	.27817	.30907	.33998	.37087	.40179	.43270
15	.057068	.17890	.19266	.20643	.22019	.24771	.27523	.30276	.33028	.35781	.38533
16	.05082	.15932	.17157	.18383	.19608	.22059	.24510	.26961	.29412	.31863	.34314
17	.045257	.14188	.15279	.16370	.17462	.19644	.21827	.24010	.26193	.28375	.30558
18	.040303	.12635	.13607	.14578	.15550	.17494	.19438	.21382	.23325	.25269	.27213
19	.03589	.11251	.12117	.12982	.13848	.15579	.17310	.19040	.20771	.22502	.24233
20	.031961	.10019	.10790	.11561	.12332	.13873	.15415	.16956	.18497	.20039	.21580
21	.028462	.08923	.09609	.10295	.10982	.12354	.13727	.15100	.16472	.17845	.19218
22	.025347	.07946	.08557	.09169	.09780	.11002	.12225	.13447	.14670	.15892	.17115
23	.022571	.07076	.07620	.08164	.08709	.09797	.10886	.11974	.13063	.14152	.15240
24	.0201	.06301	.06786	.07271	.07755	.08725	.09694	.10664	.11633	.12602	.13572
25	.0179	.05612	.06043	.06475	.06906	.07770	.08633	.09496	.10360	.11223	.12086
26	.01594	.04997	.05381	.05766	.06150	.06919	.07688	.08457	.09225	.09994	.10763
27	.014195	.04450	.04792	.05135	.05477	.06162	.06846	.07531	.08215	.08900	.09585
28	.012641	.03963	.04268	.04573	.04877	.05487	.06097	.07606	.07316	.07926	.08535
29	.011257	.03529	.03800	.04072	.04343	.04886	.05429	.05972	.06515	.07058	.07601
30	.010025	.03143	.03385	.03626	.03868	.04352	.04835	.05319	.05802	.06286	.06769
31	.008928	.02799	.03014	.03229	.03445	.03875	.04306	.04737	.05167	.05598	.06028
32	.00795	.02492	.02684	.02876	.03067	.03451	.03834	.04218	.04601	.04985	.05368
33	.00708	.02220	.02390	.02561	.02732	.03073	.03415	.03756	.04098	.04439	.04781
34	.006304	.01976	.02128	.02280	.02432	.02736	.03040	.03344	.03648	.03953	.04257
35	.005614	.01760	.01895	.02030	.02166	.02437	.02708	.02978	.03249	.03520	.03791
36	.005	.01568	.01688	.01809	.01929	.02170	.02412	.02653	.02894	.03135	.03376
37	.004453	.01396	.01503	.01611	.01718	.01933	.02148	.02362	.02577	.02792	.03007
38	.003965	.01243	.01339	.01434	.01530	.01721	.01912	.02104	.02295	.02486	.02677
39	.003531	.01107	.01192	.01277	.01362	.01533	.01703	.01873	.02044	.02214	.02384
40	.003144	.00986	.01061	.01137	.01213	.01365	.01516	.01668	.01820	.01971	.02123

(Continued on next page)

APPROXIMATE WEIGHTS OF

Sheet and Strip Copper

Brown and Sharpe's Gauge.

Pounds per Lineal Foot

Gauge No.	Decimal Inch	Widths in Inches 1⅞	2	2¼	2½	2¾	3	3¼	3½	3¾	4
6	.16202	1.17211	1.25025	1.40654	1.56282	1.71910	1.87538	2.03166	2.18795	2.34423	2.50051
7	.14428	1.04378	1.11336	1.25253	1.39170	1.53087	1.67004	1.80921	1.94838	2.08755	2.22672
8	.12849	.92955	.99152	1.11545	1.23939	1.36333	1.48727	1.61121	1.73515	1.85909	1.98303
9	.11443	.82783	.88302	.99340	1.10377	1.21415	1.32453	1.43491	1.54528	1.65566	1.76604
10	.10189	.73711	.78625	.88453	.98281	1.08110	1.17938	1.27766	1.37594	1.47422	1.57250
11	.090742	.65646	.70023	.78775	.87528	.96281	1.05034	1.13787	1.22540	1.31292	1.40045
12	.080808	.58460	.62357	.70152	.77946	.85741	.93535	1.01330	1.09125	1.16919	1.24714
13	.071961	.52059	.55530	.62471	.69412	.76354	.83295	.90236	.97177	1.04119	1.11060
14	.064084	.46361	.49452	.55633	.61814	.67996	.74177	.80359	.86540	.92722	.98903
15	.057068	.41285	.44038	.49543	.55047	.60552	.66056	.71561	.77066	.82570	.88075
16	.05082	.36765	.39216	.44118	.49020	.53922	.58824	.63726	.68628	.73530	.78432
17	.045257	.32741	.34923	.39289	.43654	.48020	.52385	.56750	.61116	.65481	.69847
18	.040303	.29157	.31101	.34988	.38876	.42763	.46651	.50538	.54426	.58313	.62201
19	.03589	.25964	.27695	.31157	.34619	.38081	.41543	.45005	.48467	.51928	.55390
20	.031961	.23122	.24663	.27746	.30829	.33912	.36995	.40078	.43161	.46244	.49327
21	.028462	.20591	.21963	.24709	.27454	.30199	.32945	.35690	.38436	.41181	.43926
22	.025347	.18337	.19559	.22004	.24449	.26894	.29339	.31784	.34229	.36674	.39119
23	.022571	.16329	.17417	.19595	.21772	.23949	.26126	.28303	.30480	.32657	.34835
24	.0201	.14541	.15511	.17449	.19388	.21327	.23266	.25205	.27143	.29082	.31021
25	.0179	.12950	.13813	.15539	.17266	.18993	.20719	.22446	.24173	.25899	.27626
26	.01594	.11532	.12300	.13838	.15376	.16913	.18451	.19988	.21526	.23063	.24601
27	.014195	.10269	.10954	.12323	.13692	.15062	.16431	.17800	.19169	.20538	.21908
28	.012641	.09145	.09755	.10974	.12193	.13413	.14632	.15851	.17071	.18290	.19509
29	.011257	.08144	.08687	.09773	.10858	.11944	.13030	.14116	.15202	.16288	.17373
30	.010025	.07253	.07736	.08703	.09670	.10637	.11604	.12571	.13538	.14505	.15472
31	.008928	.06459	.06889	.07751	.08612	.09473	.10334	.11195	.12057	.12918	.13779
32	.00795	.05751	.06135	.06902	.07668	.08435	.09202	.09969	.10736	.11503	.12270
33	.00708	.05122	.05463	.06146	.06829	.07512	.08195	.08878	.09561	.10244	.10927
34	.006304	.04561	.04865	.05473	.06081	.06689	.07297	.07905	.08513	.09121	.09729
35	.005614	.04061	.04332	.04874	.05415	.05957	.06498	.07040	.07581	.08123	.08664
36	.005	.03617	.03858	.04341	.04823	.05305	.05788	.06270	.06572	.07234	.07717
37	.004453	.03222	.03436	.03866	.04295	.04725	.05154	.05584	.06013	.06443	.06873
38	.003965	.02868	.03060	.03442	.03825	.04207	.04590	.04972	.05354	.05737	.06119
39	.003531	.02555	.02725	.03065	.03406	.03747	.04087	.04428	.04768	.05109	.05450
40	.003144	.02275	.02426	.02729	.03033	.03336	.03639	.03942	.04246	.04549	.04852

Gauge No.	Decimal Inch	Widths in Inches 4½	5	5½	6	7	8	9	10	11	12
6	.16202	2.81307	3.12564	3.43820	3.75076	4.37589	5.00102	5.62615	6.25127	6.87640	7.50153
7	.14428	2.50506	2.78340	3.06174	3.34008	3.89676	4.45344	5.01012	5.56680	6.12348	6.68016
8	.12849	2.23091	2.47879	2.72667	2.97454	3.47030	3.96606	4.46182	4.95757	5.45333	5.94909
9	.11443	1.98679	2.20755	2.42830	2.64906	3.09056	3.53207	3.97358	4.41509	4.85660	5.29811
10	.10189	1.76907	1.06563	2.16219	2.35875	2.75188	3.14500	3.53813	3.93126	4.32438	4.71751
11	.090742	1.57551	1.75056	1.92562	2.10068	2.45079	2.80090	3.15102	3.50113	3.85124	4.20136
12	.080808	1.40303	1.55892	1.71481	1.87071	2.18249	2.49427	2.80606	3.11784	3.42963	3.74141
13	.071961	1.24942	1.38825	1.52707	1.66590	1.94355	2.22120	2.49885	2.77650	3.05415	3.33179
14	.064084	1.11266	1.23629	1.35992	1.48355	1.73080	1.97806	2.22532	2.47257	2.71983	2.96709
15	.057068	.99084	1.10094	1.21103	1.32112	1.54131	1.76150	1.98169	2.20187	2.42206	2.64225
16	.05082	.88236	.98040	1.07844	1.17648	1.37256	1.56864	1.76473	1.96081	2.15689	2.35297
17	.045257	.78578	.87308	.96039	1.04770	1.22232	1.39693	1.57155	1.74617	1.92078	2.09540
18	.040303	.69976	.77751	.85526	.93302	1.08852	1.24402	1.39952	1.55502	1.71053	1.86603
19	.03589	.62314	.69238	.76162	.83085	.96933	1.10781	1.24628	1.38476	1.52323	1.66171
20	.031961	.55492	.61658	.67824	.73990	.86321	.98653	1.10985	1.23316	1.35648	1.47979
21	.028462	.49418	.54908	.60399	.65890	.76871	.87853	.98834	1.09816	1.20798	1.31779
22	.025347	.44009	.48899	.53789	.58678	.68458	.78238	.88018	.97797	1.07577	1.17357
23	.022571	.39189	.43543	.47898	.52252	.60961	.69669	.78378	.87086	.95795	1.04504
24	.0201	.34899	.38776	.42654	.46532	.54287	.62042	.69797	.77553	.85308	.93063
25	.0179	.31079	.34532	.37985	.41439	.48345	.55251	.62158	.69064	.75971	.82877
26	.01594	.27676	.30751	.33826	.36901	.43051	.49202	.55352	.61502	.67652	.73802
27	.014195	.24646	.27385	.30123	.32861	.38338	.43815	.49292	.54769	.60246	.65723
28	.012641	.21948	.24387	.26825	.29264	.34141	.39019	.43896	.48773	.53651	.58528
29	.011257	.19545	.21717	.23888	.26060	.30403	.34747	.39090	.43433	.47777	.52120
30	.010025	.17406	.19340	.21274	.23208	.27076	.30944	.34812	.38680	.42548	.46416
31	.008928	.15501	.17224	.18946	.20668	.24113	.27558	.31002	.34447	.37892	.41337
32	.00795	.13803	.15337	.16871	.18404	.21472	.24539	.27606	.30674	.33741	.36809
33	.00708	.12293	.13659	.15024	.16390	.19122	.21854	.24585	.27317	.30049	.32780
34	.006304	.10945	.12162	.13378	.14594	.17026	.19458	.21891	.24323	.26755	.29188
35	.005614	.09747	.10830	.11913	.12996	.15163	.17329	.19495	.21661	.23827	.25993
36	.005	.08681	.09646	.10610	.11575	.13504	.15433	.17363	.19292	.21221	.23150
37	.004453	.07732	.08591	.09450	.10309	.....	.....	.....	.....	.....	.....
38	.003965	.06884	.07649	.08414	.09179	.....	.....	.....	.....	.....	.....
39	.003531	.06131	.06812	.07493	.08174	.....	.....	.....	.....	.....	.....
40	.003144	.05459	.06065	.06672	.07278	.....	.....	.....	.....	.....	.....

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O.D. Inch		Gauge No.	11	12	14	16	18	19	20	21	22
		Dec. Wall Thickness.	.120	.109	.083	.065	.049	.042	.035	.032	.028
1/16	Dec. Inch O. D.										
	Dec. Inch I. D.										
	Wght. Ft. Brass										
	Wght. Ft. Copper										
3/32	Dec. Inch O. D.								.09375	.09375	.09375
	Dec. Inch I. D.								**.02375**	**.02975**	**.03775**
	Wght. Ft. Brass								.02381	.02286	.02130
	Wght. Ft. Copper								**.02502**	**.02404**	**.02240**
1/8	Dec. Inch O. D.						.125	.125	.125	.125	.125
	Dec. Inch I. D.						**.027**	**.041**	**.055**	**.061**	**.069**
	Wght. Ft. Brass						.04309	.04033	.03645	.03443	.03142
	Wght. Ft. Copper						**.04530**	**.04241**	**.03832**	**.03620**	**.03304**
5/32	Dec. Inch O. D.						.15625	.15625	.15625	.15625	.15625
	Dec. Inch I. D.						**.05825**	**.07225**	**.08625**	**.09225**	**.10025**
	Wght. Ft. Brass						.06080	.05552	.04100	.04600	.04155
	Wght. Ft. Copper						**.06393**	**.05838**	**.05163**	**.04837**	**.04369**
3/16	Dec. Inch O. D.						.1875	.1875	.1875	.1875	.1875
	Dec. Inch I. D.						**.0895**	**.1035**	**.1175**	**.1235**	**.1315**
	Wght. Ft. Brass						.07852	.07070	.06175	.05757	.05167
	Wght. Ft. Copper						**.08256**	**.07434**	**.06493**	**.06054**	**.05433**
7/32	Dec. Inch O. D.						.21875	.21875	.21875	.21875	.21875
	Dec. Inch I. D.						**.12075**	**.13475**	**.14875**	**.15475**	**.16275**
	Wght. Ft. Brass						.09624	.08589	.07441	.06914	.06179
	Wght. Ft. Copper						**.1012**	**.09031**	**.07824**	**.07270**	**.06498**
1/4	Dec. Inch O. D.					.250	.250	.250	.250	.250	.250
	Dec. Inch I. D.					**.120**	**.152**	**.166**	**.180**	**.186**	**.194**
	Wght. Ft. Brass					.139	.1140	.1011	.08706	.08071	.07892
	Wght. Ft. Copper					**.146**	**.1198**	**.1063**	**.09155**	**.08487**	**.07562**
9/32	Dec. Inch O. D.					.28125	.28125	.28125	.28125	.28125	.28125
	Dec. Inch I. D.					**.15125**	**.18325**	**.19725**	**.21125**	**.21725**	**.22525**
	Wght. Ft. Brass					.163	.1317	.1163	.09972	.09228	.08204
	Wght. Ft. Copper					**.171**	**.1384**	**.1222**	**.1049**	**.09703**	**.08267**
5/16	Dec. Inch O. D.					.3125	.3125	.3125	.3125	.3125	.3125
	Dec. Inch I. D.					**.1825**	**.2145**	**.2285**	**.2425**	**.2485**	**.2565**
	Wght. Ft. Brass					.186	.1494	.1314	.1124	.1039	.09217
	Wght. Ft. Copper					**.196**	**.1571**	**.1382**	**.1182**	**.1092**	**.09691**
11/32	Dec. Inch O. D.				.34375	.34375	.34375	.34375	.34375	.34375	.34375
	Dec. Inch I. D.				**.17775**	**.21375**	**.24575**	**.25975**	**.27375**	**.27975**	**.28775**
	Wght. Ft. Brass				.252	.210	.1671	.1466	.1250	.1154	.1023
	Wght. Ft. Copper				**.264**	**.221**	**.1757**	**.1542**	**.1315**	**.1214**	**.1076**
3/8	Dec. Inch O. D.				.375	.375	.375	.375	.375	.375	.375
	Dec. Inch I. D.				**.209**	**.245**	**.277**	**.291**	**.305**	**.311**	**.319**
	Wght. Ft. Brass				.280	.233	.185	.162	.138	.127	.112
	Wght. Ft. Copper				**.295**	**.245**	**.194**	**.170**	**.145**	**.134**	**.118**
7/16	Dec. Inch O. D.				.4375	.4375	.4375	.4375	.4375	.4375	.4375
	Dec. Inch I. D.				**.2715**	**.3075**	**.3395**	**.3535**	**.3675**	**.3735**	**.3815**
	Wght. Ft. Brass				.340	.280	.220	.192	.163	.150	.133
	Wght. Ft. Copper				**.358**	**.296**	**.232**	**.202**	**.171**	**.158**	**.139**
1/2	Dec. Inch O. D.	.500	.500	.500	.500	.500	.500	.500	.500	.500	.500
	Dec. Inch I. D.	**.260**	**.282**	**.334**	**.370**	**.402**	**.416**	**.430**	**.436**	**.444**
	Wght. Ft. Brass	.528	.493	.400	.327	.256	.223	.188	.173	.153
	Wght. Ft. Copper	**.554**	**.518**	**.421**	**.344**	**.269**	**.234**	**.198**	**.182**	**.161**
9/16	Dec. Inch O. D.	.5625	.5625	.5625	.5625	.5625	.5625	.5625	.5625	.5625
	Dec. Inch I. D.	**.3225**	**.3445**	**.3965**	**.4325**	**.4645**	**.4785**	**.4925**	**.4985**	**.5065**
	Wght. Ft. Brass	.615	.572	.461	.374	.291	.253	.214	.196	.173
	Wght. Ft. Copper	**.646**	**.601**	**.484**	**.393**	**.306**	**.266**	**.225**	**.207**	**.182**
5/8	Dec. Inch O. D.	.625	.625	.625	.625	.625	.625	.625	.625	.625
	Dec. Inch I. D.	**.385**	**.407**	**.459**	**.495**	**.527**	**.541**	**.555**	**.561**	**.569**
	Wght. Ft. Brass	.701	.651	.521	.421	.327	.283	.239	.220	.193
	Wght. Ft. Copper	**.738**	**.685**	**.547**	**.443**	**.343**	**.298**	**.251**	**.231**	**.203**

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O. D. Inch	Gauge No. / Dec. Wall Thickness	23 .025	24 .022	25 .020	26 .018	27 .016	28 .014	29 .013	30 .012	31 .010
1/16	Dec. Inch O. D.	.0625	.0625	.0625	.0625	.0625	.0625	.0625	.0625	.0625
	Dec. Inch I. D.	**.0125**	**.0185**	**.0225**	**.0265**	**.0305**	**.0345**	**.0365**	**.0385**	**.0425**
	Wght. Ft. Brass	.01085	.01031	.00983	.00927	.00861	.00786	.007445	.007011	.006074
	Wght. Ft. Copper	**.01141**	**.01084**	**.01034**	**.00974**	**.00905**	**.00826**	**.007829**	**.007372**	**.006387**
3/32	Dec. Inch O. D.	.09375	.09375	.09375	.09275	.09375	.09375	.09375	.09375	.09375
	Dec. Inch I. D.	**.04375**	**.04975**	**.05375**	**.05775**	**.06175**	**.06575**	**.06775**	**.06975**	**.07375**
	Wght. Ft. Brass	.01989	.01826	.01707	.01578	.01439	.01292	.01215	.01135	.00969
	Wght. Ft. Copper	**.02091**	**.01920**	**.01794**	**.01659**	**.01513**	**.01358**	**.01277**	**.01193**	**.01019**
1/8	Dec. Inch O. D.	.125	.125	.125	.125	.125	.125	.125	.125	.125
	Dec. Inch I. D.	**.075**	**.081**	**.085**	**.089**	**.093**	**.097**	**.0990**	**.1010**	**.1040**
	Wght. Ft. Brass	.02892	.02622	.02430	.02228	.02018	.01798	.01685	.01569	.01331
	Wght. Ft. Copper	**.03041**	**.02757**	**.02555**	**.02343**	**.02122**	**.01891**	**.01771**	**.01650**	**.01399**
5/32	Dec. Inch O. D.	.15625	.15625	.15625	.15625	.15625	.15625	.15625	.15625	.15625
	Dec. Inch I. D.	**.10625**	**.11225**	**.11625**	**.12025**	**.12425**	**.12825**	**.13025**	**.13225**	**.13625**
	Wght. Ft. Brass	.03796	.03417	.03153	.02879	.02596	.02304	.02155	.02003	.01692
	Wght. Ft. Copper	**.03992**	**.03593**	**.03315**	**.03027**	**.02730**	**.02423**	**.02266**	**.02106**	**.01779**
3/16	Dec. Inch O. D.	.1875	.1875	.1875	.1875	.1875	.1875	.1875	.1875	.1875
	Dec. Inch I. D.	**.1375**	**.1435**	**.1475**	**.1515**	**.1555**	**.1595**	**.1615**	**.1635**	**.1675**
	Wght. Ft. Brass	.04700	.04213	.03876	.03530	.03175	.02810	.02625	.02437	.02054
	Wght. Ft. Copper	**.04942**	**.04429**	**.04075**	**.03712**	**.03338**	**.02955**	**.02760**	**.02562**	**.02159**
7/32	Dec. Inch O. D.	.21875	.21875	.21875	.21875	.21875	.21875	.21875	.21875	.21875
	Dec. Inch I. D.	**.16875**	**.17475**	**.17875**	**.18275**	**.18675**	**.19075**	**.19275**	**.19475**	**.19875**
	Wght. Ft. Brass	.05604	.05008	.04599	.04181	.03753	.03317	.03095	.02870	.02415
	Wght. Ft. Copper	**.05893**	**.05266**	**.04836**	**.04396**	**.03946**	**.03487**	**.03254**	**.03018**	**.02540**
1/4	Dec. Inch O. D.	.250	.250	.250	.250	.250	.250	.250	.250	.250
	Dec. Inch I. D.	**.200**	**.206**	**.210**	**.214**	**.218**	**.222**	**.224**	**.226**	**.230**
	Wght. Ft. Brass	.06508	.05803	.05322	.04832	.04332	.03823	.03565	.03304	.02777
	Wght. Ft. Copper	**.06843**	**.06102**	**.05596**	**.05080**	**.04555**	**.04019**	**.03748**	**.03474**	**.02920**
9/32	Dec. Inch O. D.	.28125	.28125	.28125	.28125	.28125	.28125	.28125	.28125	.28125
	Dec. Inch I. D.	**.23125**	**.23725**	**.24125**	**.24525**	**.24925**	**.25325**	**.25525**	**.25725**	**.26125**
	Wght. Ft. Brass	.07412	.06599	.06045	.05482	.04910	.04329	.04035	.03738	.03138
	Wght. Ft. Copper	**.07794**	**.06939**	**.06356**	**.05765**	**.05163**	**.04552**	**.04242**	**.03931**	**.03300**
5/16	Dec. Inch O. D.	.3125	.3125	.3125	.3125	.3125	.3125	.3125	.3125	.3125
	Dec. Inch I. D.	**.5625**	**.5685**	**.2725**	**.2765**	**.2805**	**.2845**	**.2865**	**.2885**	**.2925**
	Wght. Ft. Brass	.08316	.07394	.06768	.06133	.05489	.04835	.04505	.04172	.03500
	Wght. Ft. Copper	**.08744**	**.07775**	**.07117**	**.06449**	**.05771**	**.05084**	**.04737**	**.04387**	**.03680**
11/32	Dec. Inch O. D.	.34375	.34375	.34375	.34375	.34375	.34375	.34375	.34375	.34375
	Dec. Inch I. D.	**.29375**	**.29975**	**.30375**	**.30775**	**.31175**	**.31575**	**.31775**	**.31975**	**.32375**
	Wght. Ft. Brass	.09220	.08190	.07492	.06784	.06067	.05341	.04975	.04606	.03861
	Wght. Ft. Copper	**.09694**	**.08611**	**.07877**	**.07133**	**.06380**	**.05616**	**.05231**	**.04843**	**.04060**
3/8	Dec. Inch O. D.	.375	.375	.375	.375	.375	.375	.375	.375	.375
	Dec. Inch I. D.	**.325**	**.331**	**.335**	**.339**	**.343**	**.347**	**.3490**	**.3510**	**.3550**
	Wght. Ft. Brass	.101	.090	.082	.07435	.06646	.05847	.05445	.05040	.04223
	Wght. Ft. Copper	**.106**	**.094**	**.086**	**.07818**	**.06988**	**.06148**	**.05725**	**.05299**	**.04440**
7/16	Dec. Inch O. D.	.4375	.4375	.4375	.4375	.4375	.4375	.4375	.4375	.4375
	Dec. Inch I. D.	**.3875**	**.3935**	**.3975**	**.4015**	**.4055**	**.4095**	**.4115**	**.4135**	**.4175**
	Wght. Ft. Brass	.119	.106	.097	.08736	.07803	.06860	.06385	.05908	.04946
	Wght. Ft. Copper	**.125**	**.111**	**.102**	**.09186**	**.08204**	**.07213**	**.06714**	**.06212**	**.05201**
1/2	Dec. Inch O. D.	.500	.500	.500	.500	.500	.500	.500	.500	.500
	Dec. Inch I. D.	**.450**	**.456**	**.460**	**.464**	**.468**	**.472**	**.474**	**.476**	**.480**
	Wght. Ft. Brass	.137	.122	.111	.1004	.08960	.07872	.07325	.06775	.05669
	Wght. Ft. Copper	**.144**	**.128**	**.117**	**.1055**	**.09421**	**.08277**	**.07702**	**.07124**	**.05961**
9/16	Dec. Inch O. D.	.5625	.5625	.5625	.5625	.5625	.5625	.5625	.5625	.5625
	Dec. Inch I. D.	**.5125**	**.5185**	**.5225**	**.5265**	**.5305**	**.5345**	**.5365**	**.5385**	**.5425**
	Wght. Ft. Brass	.156	.138	.126	.1134	.1012	.08885	.08265	.07643	.06392
	Wght. Ft. Copper	**.163**	**.145**	**.132**	**.1192**	**.1064**	**.09342**	**.08690**	**.08037**	**.06721**
5/8	Dec. Inch O. D.	.625	.625	.625	.625	.625	.625	.625	.625	.625
	Dec. Inch I. D.	**.575**	**.581**	**.585**	**.589**	**.593**	**.597**	**.599**	**.601**	**.605**
	Wght. Ft. Brass	.174	.153	.140	.1264	.1127	.09897	.09205	.08511	.07115
	Wght. Ft. Copper	**.182**	**.161**	**.147**	**.1329**	**.1185**	**.1041**	**.09679**	**.08949**	**.07482**

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O.D. Inch		Gauge No.	8	9	10	11	12	14	16	18	19
		Dec. Wall Thickness.	.165	.148	.134	.120	.109	.083	.065	.049	.042
	Dec. Inch O. D.					.6875	.6875	.6875	.6875	.6875	.6875
11/16	**Dec. Inch I. D.**					**.4475**	**.4695**	**.5215**	**.5575**	**.5895**	**.6035**
	Wght. Ft. Brass					.788	.730	.581	.468	.362	.314
	Wght. Ft. Copper					**.828**	**.767**	**.610**	**.492**	**.381**	**.330**
	Dec. Inch O. D.					.750	.750	.750	.750	.750	.750
¾	**Dec. Inch I. D.**					**.510**	**.532**	**.584**	**.620**	**.652**	**.666**
	Wght. Ft. Brass					.875	.808	.641	.515	.397	.344
	Wght. Ft. Copper					**.920**	**.850**	**.673**	**.542**	**.418**	**.362**
	Dec. Inch O. D.					.8125	.8125	.8125	.8125	.8125	.8125
13/16	**Dec. Inch I. D.**					**.5725**	**.5945**	**.6465**	**.6825**	**.7145**	**.7285**
	Wght. Ft. Brass					.962	.887	.701	.562	.433	.374
	Wght. Ft. Copper					**1.011**	**.933**	**.737**	**.591**	**.455**	**.394**
	Dec. Inch O. D.					.875	.875	.875	.875	.875	.875
⅞	**Dec. Inch I. D.**					**.635**	**.657**	**.709**	**.745**	**.777**	**.791**
	Wght. Ft. Brass					1.048	.966	.761	.609	.468	.405
	Wght. Ft. Copper					**1.102**	**1.016**	**.800**	**.640**	**.492**	**.426**
	Dec. Inch O. D.					.9375	.9375	.9375	.9375	.9375	.9375
15/16	**Dec. Inch I. D.**					**.6975**	**.7195**	**.7715**	**.8075**	**.8395**	**.8535**
	Wght. Ft. Brass					1.135	1.045	.821	.656	.504	.435
	Wght. Ft. Copper					**1.193**	**1.099**	**.863**	**.690**	**.530**	**.458**
	Dec. Inch O. D.					1.00	1.00	1.00	1.00	1.00	1.00
1	**Dec. Inch I. D.**					**.760**	**.782**	**.834**	**.870**	**.902**	**.916**
	Wght. Ft. Brass					1.222	1.124	.881	.703	.539	.466
	Wght. Ft. Copper					**1.285**	**1.181**	**.926**	**.739**	**.567**	**.489**
	Dec. Inch O. D.					1.0625	1.0625	1.0625	1.0625	1.0625	1.0625
1 1/16	**Dec. Inch I. D.**					**.8225**	**.8445**	**.8965**	**.9325**	**.9645**	**.9785**
	Wght. Ft. Brass					1.308	1.202	.940	.748	.575	.496
	Wght. Ft. Copper					**1.376**	**1.264**	**.989**	**.764**	**.604**	**.521**
	Dec. Inch O. D.					1.125	1.125	1.125	1.125	1.125	1.125
1⅛	**Dec. Inch I. D.**					**.885**	**.907**	**.959**	**.995**	**1.027**	**1.041**
	Wght. Ft. Brass					1.395	1.281	1.000	.792	.610	.526
	Wght. Ft. Copper					**1.467**	**1.347**	**1.052**	**.838**	**.641**	**.553**
	Dec. Inch O. D.					1.1875	1.1875	1.1875	1.1875	1.1875	1.1875
1 3/16	**Dec. Inch I. D.**					**.9475**	**.9655**	**1.0215**	**1.0575**	**1.0895**	**1.1035**
	Wght. Ft. Brass					1.482	1.360	1.061	.842	.646	.557
	Wght. Ft. Copper					**1.559**	**1.430**	**1.115**	**.888**	**.679**	**.585**
	Dec. Inch O. D.	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
1¼	**Dec. Inch I. D.**	**.920**	**.954**	**.982**	**1.01**	**1.032**	**1.084**	**1.120**	**1.152**	**1.166**	
	Wght. Ft. Brass	2.071	1.887	1.730	1.569	1.439	1.121	.891	.681	.587	
	Wght. Ft. Copper	**2.178**	**1.984**	**1.819**	**1.650**	**1.513**	**1.178**	**.937**	**.716**	**.617**	
	Dec. Inch O. D.	1.3125	1.3125	1.3125	1.3125	1.3125	1.3125	1.3125	1.3125	1.3125	1.3125
1 5/16	**Dec. Inch I. D.**	**.9825**	**1.0165**	**1.0445**	**1.0725**	**1.1045**	**1.1465**	**1.1825**	**1.2145**	**1.2285**	
	Wght. Ft. Brass	2.191	1.944	1.827	1.652	1.518	1.181	.938	.717	.618	
	Wght. Ft. Copper	**2.304**	**2.007**	**1.921**	**1.741**	**1.530**	**1.241**	**.987**	**.753**	**.649**	
	Dec. Inch O. D.	1.375	1.375	1.375	1.375	1.375	1.375	1.375	1.375	1.375	1.375
1⅜	**Dec. Inch I. D.**	**1.045**	**1.079**	**1.107**	**1.135**	**1.157**	**1.209**	**1.245**	**1.277**	**1.291**	
	Wght. Ft. Brass	2.310	2.101	1.924	1.742	1.597	1.241	.985	.752	.648	
	Wght. Ft. Copper	**2.429**	**2.209**	**2.023**	**1.832**	**1.679**	**1.304**	**1.036**	**.790**	**.681**	
	Dec. Inch O. D.	1.4375	1.4375	1.4375	1.4375	1.4375	1.4375	1.4375	1.4375	1.4375	1.4375
1 7/16	**Dec. Inch I. D.**	**1.1075**	**1.1415**	**1.1695**	**1.1975**	**1.2195**	**1.2715**	**1.3075**	**1.3395**	**1.3535**	
	Wght. Ft. Brass	2.429	2.258	2.021	1.829	1.676	1.301	1.032	.788	.679	
	Wght. Ft. Copper	**2.655**	**2.322**	**2.125**	**1.924**	**1.762**	**1.368**	**1.086**	**.828**	**.713**	
	Dec. Inch O. D.	1.500	1.500	1.500	1.500	1.500	1.500	1.50	1.50	1.50	
1½	**Dec. Inch I. D.**	**1.17**	**1.204**	**1.232**	**1.260**	**1.282**	**1.334**	**1.37**	**1.402**	**1.416**	
	Wght. Ft. Brass	2.549	2.315	2.118	1.916	1.754	1.361	1.079	.823	.709	
	Wght. Ft. Copper	**2.680**	**2.434**	**2.227**	**2.015**	**1.844**	**1.431**	**1.135**	**.865**	**.745**	
	Dec. Inch O. D.	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	
1 9/16	**Dec. Inch I. D.**	**1.2325**	**1.2665**	**1.2945**	**1.3225**	**1.3445**	**1.3965**	**1.4325**	**1.4645**	**1.4785**	
	Wght. Ft. Brass	2.668	2.422	2.215	2.003	1.833	1.421	1.126	.859	.739	
	Wght. Ft. Copper	**2.806**	**2.547**	**2.329**	**2.106**	**1.927**	**1.494**	**1.185**	**.902**	**.777**	

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O.D. Inch	Gauge No. / Dec. Wall Thickness	20 .035	21 .032	22 .028	23 .025	24 .022	25 .020	26 .018	27 .016	28 .014
11/16	Dec. Inch O. D.	.6875	.6875	.6875	.6875	.6875	.6875	.6875	.6875	.6875
	Dec. Inch I. D.	**.6175**	**.6235**	**.6315**	**.6375**	**.6435**	**.6475**	**.6515**	**.6555**	**.6595**
	Wght. Ft. Brass	.264	.243	.214	.192	.169	.154	.1394	.1243	.1091
	Wght. Ft. Copper	**.278**	**.255**	**.225**	**.201**	**.178**	**.162**	**.1466**	**.1307**	**.1147**
3/4	Dec. Inch O. D.	.750	.750	.750	.750	.750	.750	.750	.750	.750
	Dec. Inch I. D.	**.680**	**.686**	**.694**	**.700**	**.706**	**.710**	**.714**	**.718**	**.722**
	Wght. Ft. Brass	.290	.266	.234	.210	.185	.169	.1524	.1359	.1192
	Wght. Ft. Copper	**.304**	**.280**	**.246**	**.220**	**.195**	**.178**	**.1603**	**.1429**	**.1254**
13/16	Dec. Inch O. D.	.8125	.8125	.8125	.8125	.8125	.8125	.8125	.8125	.8125
	Dec. Inch I. D.	**.7425**	**.7485**	**.7565**	**.7625**	**.7685**	**.7725**	**.7765**	**.7805**	**.7845**
	Wght. Ft. Brass	.315	.289	.254	.228	.201	.183	.1655	.1474	.1293
	Wght. Ft. Copper	**.331**	**.304**	**.267**	**.240**	**.212**	**.193**	**.1740**	**.1550**	**.1360**
7/8	Dec. Inch O. D.	.875	.875	.875	.875	.875	.875	.875	.875	.875
	Dec. Inch I. D.	**.805**	**.811**	**.819**	**.825**	**.831**	**.835**	**.839**	**.843**	**.847**
	Wght. Ft. Brass	.340	.312	.274	.246	.217	.198	.1785	.1590	.1395
	Wght. Ft. Copper	**.358**	**.328**	**.289**	**.259**	**.228**	**.208**	**.1877**	**.1672**	**.1466**
15/16	Dec. Inch O. D.	.9375	.9375	.9375	.9375	.9375	.9375	.9375	.9375	.9375
	Dec. Inch I. D.	**.8675**	**.8735**	**.8815**	**.8875**	**8935**	**.8975**	**.9015**	**.9055**	**.9095**
	Wght. Ft. Brass	.366	.335	.295	.264	.233	.212	.1915	.1706	.1496
	Wght. Ft. Copper	**.384**	**.353**	**.310**	**.278**	**.245**	**.223**	**.2014**	**.1794**	**.1573**
1	Dec. Inch O. D.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Dec. Inch I. D.	**.930**	**.936**	**.944**	**.950**	**.956**	**.960**	**.964**	**.968**	**.972**
	Wght. Ft. Brass	.391	.358	.315	.282	.249	.227	.2045	.1822	.1597
	Wght. Ft. Copper	**.411**	**.377**	**.331**	**.297**	**.262**	**.238**	**.2150**	**.1915**	**.1679**
1 1/16	Dec. Inch O. D.	1.0625	1.0625	1.0625	1.0625	1.0625	1.0625	.....	.....	.....
	Dec. Inch I. D.	**.9925**	**.9985**	**1.0065**	**1.0125**	**1.0185**	**1.0225**	.....	.....	.....
	Wght. Ft. Brass	.416	.382	.335	.300	.265	.242	.....	.....	.....
	Wght. Ft. Copper	**.4375**	**.402**	**.353**	**.316**	**.279**	**.254**	.....	.....	.....
1 1/8	Dec. Inch O. D.	1.125	1.125	1.125	1.125	1.125	1.125	.....	.....	.....
	Dec. Inch I. D.	**1.055**	**1.061**	**1.069**	**1.075**	**1.081**	**1.085**	.....	.....	.....
	Wght. Ft. Brass	.441	.405	.355	.318	.281	.256	.....	.....	.....
	Wght. Ft. Copper	**.464**	**.426**	**.374**	**.335**	**.295**	**.269**	.....	.....	.....
1 3/16	Dec. Inch O. D.	1.1875	1.1875	1.1875	1.1875	1.1875	1.1875	.....	.....	.....
	Dec. Inch I. D.	**1.1175**	**1.1235**	**1.1315**	**1.1375**	**1.1435**	**1.1475**	.....	.....	.....
	Wght. Ft. Brass	.467	.428	.376	.336	.297	.271	.....	.....	.....
	Wght. Ft. Copper	**.491**	**.450**	**.395**	**.354**	**.312**	**.284**	.....	.....	.....
1 1/4	Dec. Inch O. D.	1.250	1.250	1.250	1.250	1.250	1.250	.....	.....	.....
	Dec. Inch I. D.	**1.180**	**1.186**	**1.194**	**1.200**	**1.206**	**1.210**	.....	.....	.....
	Wght. Ft. Brass	.492	.451	.396	.354	.313	.285	.....	.....	.....
	Wght. Ft. Copper	**.517**	**.474**	**.416**	**.373**	**.329**	**.299**	.....	.....	.....
1 5/16	Dec. Inch O. D.	1.3125	1.3125	1.3125	1.3125	1.3125	1.3125	.....	.....	.....
	Dec. Inch I. D.	**1.2425**	**1.2485**	**1.2565**	**1.2625**	**1.2685**	**1.2725**	.....	.....	.....
	Wght. Ft. Brass	.518	.474	.416	.373	.329	.300	.....	.....	.....
	Wght. Ft. Copper	**.544**	**.499**	**.438**	**.392**	**.346**	**.315**	.....	.....	.....
1 3/8	Dec. Inch O. D.	1.375	1.375	1.375	1.375	1.375	1.375	.....	.....	.....
	Dec. Inch I. D.	**1.305**	**1.311**	**1.319**	**1.325**	**1.331**	**1.335**	.....	.....	.....
	Wght. Ft. Brass	.543	.497	.436	.391	.344	.314	.....	.....	.....
	Wght. Ft. Copper	**.571**	**.523**	**.459**	**.411**	**.362**	**.330**	.....	.....	.....
1 7/16	Dec. Inch O. D.	1.4375	1.4375	1.4375	1.4375	1.4375	1.4375	.....	.....	.....
	Dec. Inch I. D.	**1.3675**	**1.3735**	**1.3815**	**1.3875**	**1.3935**	**1.3975**	.....	.....	.....
	Wght. Ft. Brass	.568	.521	.457	.409	.360	.328	.....	.....	.....
	Wght. Ft. Copper	**.598**	**.547**	**.480**	**.430**	**.379**	**.345**	.....	.....	.....
1 1/2	Dec. Inch O. D.	1.500	1.500	1.500	1.500	1.500	1.500	.....	.....	.....
	Dec. Inch I. D.	**1.430**	**1.436**	**1.444**	**1.450**	**1.456**	**1.460**	.....	.....	.....
	Wght. Ft. Brass	.593	.544	.477	.427	.376	.342	.....	.....	.....
	Wght. Ft. Copper	**.624**	**.571**	**.501**	**.449**	**.396**	**.360**	.....	.....	.....
1 9/16	Dec. Inch O. D.	1.5625	1.5625	1.5625	1.5625	1.5625	1.5625	.....	.....	.....
	Dec. Inch I. D.	**1.4925**	**1.4985**	**1.5065**	**1.5125**	**1.5185**	**1.5225**	.....	.....	.....
	Wght. Ft. Brass	.619	.567	.497	.445	.392	.357	.....	.....	.....
	Wght. Ft. Copper	**.651**	**.596**	**.523**	**.468**	**.413**	**.376**	.....	.....	.....

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O.D. Inch		Gauge No. 8	9	10	11	12	14	16	18	19
		Dec. Wall Thickness .165	.148	.134	.120	.109	.083	.065	.049	.042
1⅝	Dec. Inch O. D.	1.625	1.625	1.625	1.625	1.625	1.625	1.625	1.625	1.625
	Dec. Inch I. D.	**1.295**	**1.329**	**1.357**	**1.385**	**1.407**	**1.459**	**1.495**	**1.527**	**1.541**
	Wght. Ft. Brass	2.787	2.529	2.312	2.090	1.912	1.481	1.173	.894	.769
	Wght. Ft. Copper	**2.931**	**2.659**	**2.431**	**2.197**	**2.010**	**1.557**	**1.234**	**.939**	**.809**
1¾	Dec. Inch O. D.	1.75	1.75	1.75	1.75	1.75	1.75	1.750	1.750	1.750
	Dec. Inch I. D.	**1.420**	**1.454**	**1.482**	**1.510**	**1.532**	**1.584**	**1.620**	**1.652**	**1.666**
	Wght. Ft. Brass	3.026	2.743	2.505	2.263	2.070	1.601	1.267	.964	.830
	Wght. Ft. Copper	**3.182**	**2.884**	**2.634**	**2.380**	**2.176**	**1.683**	**1.332**	**1.014**	**.873**
1⅞	Dec. Inch O. D.	1.875	1.875	1.875	1.875	1.875	1.875	1.875	1.875	1.875
	Dec. Inch I. D.	**1.545**	**1.579**	**1.607**	**1.635**	**1.657**	**1.709**	**1.745**	**1.777**	**1.791**
	Wght. Ft. Brass	3.264	2.957	2.699	2.437	2.227	1.721	1.361	1.035	.891
	Wght. Ft. Copper	**3.432**	**3.109**	**2.838**	**2.562**	**2.342**	**1.809**	**1.431**	**1.088**	**.937**
2	Dec. Inch O. D.	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Dec. Inch I. D.	**1.670**	**1.704**	**1.732**	**1.760**	**1.782**	**1.834**	**1.870**	**1.902**	**1.916**
	Wght. Ft. Brass	3.503	3.171	2.893	2.610	2.385	1.841	1.455	1.106	.952
	Wght. Ft. Copper	**3.683**	**3.334**	**3.042**	**2.744**	**2.507**	**1.936**	**1.530**	**1.163**	**1.000**
2⅛	Dec. Inch O. D.	2.125	2.125	2.125	2.125	2.125	2.125	2.125	2.125	2.125
	Dec. Inch I. D.	**1.795**	**1.829**	**1.857**	**1.885**	**1.907**	**1.959**	**1.995**	**2.027**	**2.041**
	Wght. Ft. Brass	3.742	3.385	3.087	2.784	2.542	1.961	1.549	1.177	1.012
	Wght. Ft. Copper	**3.934**	**3.560**	**3.246**	**2.927**	**2.673**	**2.062**	**1.629**	**1.237**	**1.064**
2¼	Dec. Inch O. D.	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
	Dec. Inch I. D.	**1.920**	**1.954**	**1.982**	**2.010**	**2.032**	**2.084**	**2.120**	**2.152**	**2.166**
	Wght. Ft. Brass	3.980	3.599	3.281	2.957	2.700	2.081	1.643	1.248	1.073
	Wght. Ft. Copper	**4.185**	**3.785**	**3.449**	**3.109**	**2.839**	**2.188**	**1.728**	**1.312**	**1.128**
2⅜	Dec. Inch O. D.	2.375	2.375	2.375	2.375	2.375	2.375	2.375	2.375	2.375
	Dec. Inch I. D.	**2.045**	**2.079**	**2.107**	**2.135**	**2.157**	**2.209**	**2.245**	**2.277**	**2.291**
	Wght. Ft. Brass	4.219	3.813	3.474	3.131	2.858	2.201	1.737	1.319	1.134
	Wght. Ft. Copper	**4.436**	**4.010**	**3.653**	**3.292**	**3.005**	**2.314**	**1.827**	**1.387**	**1.192**
2½	Dec. Inch O. D.	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
	Dec. Inch I. D.	**2.170**	**2.204**	**2.232**	**2.260**	**2.282**	**2.334**	**2.370**	**2.402**	**2.416**
	Wght. Ft. Brass	4.458	4.027	3.668	3.304	3.015	2.321	1.831	1.390	1.194
	Wght. Ft. Copper	**4.687**	**4.235**	**3.857**	**3.474**	**3.170**	**2.440**	**1.925**	**1.461**	**1.256**
2⅝	Dec. Inch O. D.	2.625	2.625	2.625	2.625	2.625	2.625	2.625	2.625	2.625
	Dec. Inch I. D.	**2.295**	**2.329**	**2.357**	**2.385**	**2.407**	**2.459**	**2.495**	**2.527**	**2.541**
	Wght. Ft. Brass	4.696	4.241	3.862	3.478	3.173	2.441	1.925	1.460	1.255
	Wght. Ft. Copper	**4.938**	**4.460**	**4.061**	**3.657**	**3.336**	**2.567**	**2.024**	**1.536**	**1.320**
2¾	Dec. Inch O. D.	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
	Dec. Inch I. D.	**2.420**	**2.454**	**2.482**	**2.510**	**2.532**	**2.584**	**2.620**	**2.652**	**2.666**
	Wght. Ft. Brass	4.935	4.456	4.056	3.651	3.331	2.561	2.019	1.531	1.316
	Wght. Ft. Copper	**5.189**	**4.685**	**4.264**	**3.839**	**3.502**	**2.693**	**2.123**	**1.610**	**1.384**
2⅞	Dec. Inch O. D.	2.875	2.875	2.875	2.875	2.875	2.875	2.875	2.875	2.875
	Dec. Inch I. D.	**2.545**	**2.579**	**2.607**	**2.635**	**2.668**	**2.819**	**2.745**	**2.777**	**2.791**
	Wght. Ft. Brass	5.173	4.670	4.250	3.825	3.488	2.681	2.113	1.602	1.377
	Wght. Ft. Copper	**5.440**	**4.910**	**4.468**	**4.022**	**3.668**	**2.819**	**2.222**	**1.685**	**1.448**
3	Dec. Inch O. D.	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Dec. Inch I. D.	**2.670**	**2.704**	**2.732**	**2.760**	**2.782**	**2.834**	**2.870**	**2.902**	**2.916**
	Wght. Ft. Brass	5.412	4.884	4.443	3.999	3.646	2.801	2.207	1.673	1.437
	Wght. Ft. Copper	**5.691**	**5.135**	**4.672**	**4.204**	**3.834**	**2.945**	**2.321**	**1.759**	**1.511**
3⅛	Dec. Inch O. D.	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125	3.125
	Dec. Inch I. D.	**2.795**	**2.829**	**2.857**	**2.885**	**2.907**	**2.959**	**2.995**	**3.027**	**3.041**
	Wght. Ft. Brass	5.651	5.098	4.637	4.172	3.804	2.921	2.301	1.744	1.498
	Wght. Ft. Copper	**5.942**	**5.361**	**4.876**	**4.387**	**3.999**	**3.072**	**2.420**	**1.834**	**1.575**
3¼	Dec. Inch O. D.	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
	Dec. Inch I. D.	**2.920**	**2.954**	**2.982**	**3.010**	**3.032**	**3.084**	**3.120**	**3.152**	**3.166**
	Wght. Ft. Brass	5.889	5.312	4.831	4.346	3.961	3.041	2.395	1.815	1.559
	Wght. Ft. Copper	**6.193**	**5.585**	**5.080**	**4.569**	**4.165**	**3.198**	**2.519**	**1.908**	**1.639**
3⅜	Dec. Inch O. D.	3.375	3.375	3.375	3.375	3.375	3.375	3.375	3.375	3.375
	Dec. Inch I. D.	**3.045**	**3.079**	**3.107**	**3.135**	**3.157**	**3.209**	**3.245**	**3.277**	**3.291**
	Wght. Ft. Brass	6.128	5.526	5.025	4.519	4.119	3.161	2.489	1.886	1.620
	Wght. Ft. Copper	**6.443**	**5.810**	**5.283**	**4.752**	**4.331**	**3.324**	**2.617**	**1.983**	**1.703**

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Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameter.

O.D. Inch	Gauge No. / Dec. Wall Thickness	20 .035	21 .032	22 .028	23 .025	24 .022	25 .020			
	Dec. Inch O. D.	1.625	1.625	1.625	1.625	1.625	1.625	.....	.....	.....
1⅝	**Dec. Inch I. D.**	**1.555**	**1.561**	**1.569**	**1.575**	**1.581**	**1.585**	.....	.....	.....
	Wght. Ft. Brass	.644	.590	.517	.463	.408	.371	.....	.....	.....
	Wght. Ft. Copper	**.677**	**.620**	**.544**	**.487**	**.429**	**.391**	.....	.....	.....
	Dec. Inch O. D.	1.750	1.750	1.750	1.750	1.750	1.750	.....	.....	.....
1¾	**Dec. Inch I. D.**	**1.680**	**1.686**	**1.694**	**1.700**	**1.706**	**1.710**	.....	.....	.....
	Wght. Ft. Brass	.695	.636	.558	.499	.440	.400	.....	.....	.....
	Wght. Ft. Copper	**.730**	**.669**	**.587**	**.525**	**.462**	**.421**	.....	.....	.....
	Dec. Inch O. D.	1.875	1.875	1.875	1.875	1.875	1.875	.....	.....	.....
1⅞	**Dec. Inch I. D.**	**1.805**	**1.811**	**1.819**	**1.825**	**1.831**	**1.835**	.....	.....	.....
	Wght. Ft. Brass	.745	.682	.598	.535	.472	.429	.....	.....	.....
	Wght. Ft. Copper	**.783**	**.717**	**.629**	**.563**	**.460**	**.451**	.....	.....	.....
	Dec. Inch O. D.	2.00	2.00	2.00	2.00	2.00	2.00	.....	.....	.....
2	**Dec. Inch I. D.**	**1.930**	**1.936**	**1.944**	**1.950**	**1.956**	**1.960**	.....	.....	.....
	Wght. Ft. Brass	.796	.729	.639	.571	.503	.458	.....	.....	.....
	Wght. Ft. Copper	**.837**	**.766**	**.672**	**.601**	**.529**	**.482**	.....	.....	.....
	Dec. Inch O. D.	2.125	2.125	2.125	2.125	2.125	2.125	.....	.....	.....
2⅛	**Dec. Inch I. D.**	**2.055**	**2.061**	**2.069**	**2.075**	**2.081**	**2.085**	.....	.....	.....
	Wght. Ft. Brass	.846	.775	.679	.607	.535	.487	.....	.....	.....
	Wght. Ft. Copper	**.890**	**.815**	**.714**	**.639**	**.563**	**.512**	.....	.....	.....
	Dec. Inch O. D.	2.25	2.25	2.25	2.25	2.25	2.25	.....	.....	.....
2¼	**Dec. Inch I. D.**	**2.180**	**2.186**	**2.194**	**2.200**	**2.206**	**2.210**	.....	.....	.....
	Wght. Ft. Brass	.897	.821	.720	.644	.567	.516	.....	.....	.....
	Wght. Ft. Copper	**.943**	**.863**	**.757**	**.677**	**.596**	**.543**	.....	.....	.....
	Dec. Inch O. D.	2.375	2.375	2.375	2.375	2.375	2.375	.....	.....	.....
2⅜	**Dec. Inch I. D.**	**2.305**	**2.311**	**2.319**	**2.325**	**2.331**	**2.335**	.....	.....	.....
	Wght. Ft. Brass	.948	.868	.760	.680	.599	.545	.....	.....	.....
	Wght. Ft. Copper	**.996**	**.912**	**.799**	**.715**	**.630**	**.573**	.....	.....	.....
	Dec. Inch O. D.	2.50	2.50	2.50	2.50	2.50	2.50	.....	.....	.....
2½	**Dec. Inch I. D.**	**2.430**	**2.436**	**2.444**	**2.450**	**2.456**	**2.460**	.....	.....	.....
	Wght. Ft. Brass	.998	.914	.801	.716	.631	.574	.....	.....	.....
	Wght. Ft. Copper	**1.050**	**.961**	**.842**	**.753**	**.663**	**.603**	.....	.....	.....
	Dec. Inch O. D.	2.625	2.625	2.625	2.625	.....	.....	.....	.....	.....
2⅝	**Dec. Inch I. D.**	**2.555**	**2.561**	**2.569**	**2.575**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.049	.960	.841	.752	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.103**	**1.009**	**.885**	**.791**	.....	.....	.....	.....	.....
	Dec. Inch O. D.	2.750	2.750	2.750	2.750	.....	.....	.....	.....	.....
2¾	**Dec. Inch I. D.**	**2.680**	**2.686**	**2.694**	**2.700**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.099	1.006	.882	.788	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.156**	**1.058**	**.927**	**.829**	.....	.....	.....	.....	.....
	Dec. Inch O. D.	2.875	2.875	2.875	2.875	.....	.....	.....	.....	.....
2⅞	**Dec. Inch I. D.**	**2.805**	**2.811**	**2.819**	**2.825**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.150	1.053	.922	.824	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.209**	**1.107**	**.970**	**.867**	.....	.....	.....	.....	.....
	Dec. Inch O. D.	3.00	3.00	3.00	3.00	.....	.....	.....	.....	.....
3	**Dec. Inch I. D.**	**2.930**	**2.936**	**2.944**	**2.950**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.201	1.099	.963	.861	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.262**	**1.155**	**1.012**	**.905**	.....	.....	.....	.....	.....
	Dec. Inch O. D.	3.125	3.125	3.125	3.125	.....	.....	.....	.....	.....
3⅛	**Dec. Inch I. D.**	**3.055**	**3.061**	**3.069**	**3.075**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.251	1.145	1.003	.897	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.316**	**1.204**	**1.055**	**.943**	.....	.....	.....	.....	.....
	Dec. Inch O. D.	3.25	3.25	3.25	3.25	.....	.....	.....	.....	.....
3¼	**Dec. Inch I. D.**	**3.18**	**3.186**	**3.194**	**3.20**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.302	1.191	1.044	.933	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.369**	**1.253**	**1.097**	**.981**	.....	.....	.....	.....	.....
	Dec. Inch O. D.	3.375	3.375	3.375	3.375	.....	.....	.....	.....	.....
3⅜	**Dec. Inch I. D.**	**3.305**	**3.311**	**3.319**	**3.325**	.....	.....	.....	.....	.....
	Wght. Ft. Brass	1.353	1.238	1.084	.969	.....	.....	.....	.....	.....
	Wght. Ft. Copper	**1.422**	**1.301**	**1.140**	**1.019**	.....	.....	.....	.....	.....

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O.D. Inch	Gauge No. / Dec. Wall Thickness	8 .165	9 .148	10 .134	11 .120	12 .109	14 .083	16 .065	18 .049	19 .042	20 .035
	Dec. Inch O. D.	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
3½	**Dec. Inch I. D.**	**3.170**	**3.204**	**3.232**	**3.260**	**3.282**	**3.334**	**3.370**	**3.402**	**3.416**	**3.430**
	Wght. Ft. Brass	6.367	5.740	5.219	4.693	4.276	3.281	2.583	1.957	1.680	1.403
	Wght. Ft. Copper	**6.694**	**6.035**	**5.487**	**4.934**	**4.497**	**3.450**	**2.716**	**2.057**	**1.767**	**1.475**
	Dec. Inch O. D.	3.625	3.625	3.625	3.625	3.625	3.625	3.625	3.625	3.625	3.625
3⅝	**Dec. Inch I. D.**	**3.295**	**3.329**	**3.357**	**3.385**	**3.407**	**3.459**	**3.495**	**3.527**	**3.541**	**3.555**
	Wght. Ft. Brass	6.605	5.954	5.413	4.866	4.434	3.401	2.677	2.027	1.741	1.454
	Wght. Ft. Copper	**6.945**	**6.260**	**5.691**	**5.117**	**4.662**	**3.576**	**2.815**	**2.132**	**1.831**	**1.529**
	Dec. Inch O. D.	3.750	3.750	3.750	3.750	3.750	3.750	3.75	3.75	3.75	3.75
3¾	**Dec. Inch I. D.**	**3.420**	**3.454**	**3.482**	**3.510**	**3.532**	**3.584**	**3.620**	**3.652**	**3.666**	**3.680**
	Wght. Ft. Brass	6.844	6.168	5.606	5.040	4.592	3.521	2.771	2.098	1.802	1.504
	Wght. Ft. Copper	**7.196**	**6.485**	**5.895**	**5.299**	**4.828**	**3.703**	**2.914**	**2.206**	**1.895**	**1.582**
	Dec. Inch O. D.	3.875	3.875	3.875	3.875	3.875	3.875	3.875	3.875	3.875	3.875
3⅞	**Dec. Inch I. D.**	**3.545**	**3.579**	**3.607**	**3.635**	**3.657**	**3.709**	**3.745**	**3.777**	**3.791**	**3.805**
	Wght. Ft. Brass	7.083	6.382	5.800	5.213	4.749	3.642	2.865	2.169	1.863	1.555
	Wght. Ft. Copper	**7.447**	**6.710**	**6.098**	**5.482**	**4.994**	**3.829**	**3.013**	**2.281**	**1.958**	**1.635**
	Dec. Inch O. D.	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
4	**Dec. Inch I. D.**	**3.670**	**3.704**	**3.732**	**3.760**	**3.782**	**3.834**	**3.870**	**3.902**	**3.916**	**3.930**
	Wght. Ft. Brass	7.321	6.596	5.994	5.387	4.907	3.762	2.959	2.240	1.923	1.606
	Wght. Ft. Copper	**7.698**	**6.935**	**6.302**	**5.664**	**5.160**	**3.955**	**3.112**	**2.355**	**2.022**	**1.688**
	Dec. Inch O. D.	4.125	4.125	4.125	4.125	4.125	4.125	4.125	4.125	4.125	4.125
4⅛	**Dec. Inch I. D.**	**3.795**	**3.729**	**3.857**	**3.885**	**3.907**	**3.959**	**3.995**	**4.027**	**4.041**	**4.055**
	Wght. Ft. Brass	7.560	6.810	6.188	5.561	5.065	3.882	3.053	2.311	1.984	1.656
	Wght. Ft. Copper	**7.949**	**7.161**	**6.506**	**5.847**	**5.325**	**4.081**	**3.210**	**2.430**	**2.086**	**1.741**
	Dec. Inch O. D.	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
4¼	**Dec. Inch I. D.**	**3.920**	**3.954**	**3.982**	**4.010**	**4.032**	**4.084**	**4.120**	**4.152**	**4.166**	**4.180**
	Wght. Ft. Brass	7.798	7.024	6.381	5.734	5.222	4.002	3.147	2.382	2.045	1.707
	Wght. Ft. Copper	**8.20**	**7.386**	**6.710**	**6.029**	**5.491**	**4.207**	**3.309**	**2.504**	**2.150**	**1.795**
	Dec. Inch O. D.	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
4½	**Dec. Inch I. D.**	**4.170**	**4.204**	**4.232**	**4.260**	**4.282**	**4.334**	**4.370**	**4.402**	**4.416**	**4.430**
	Wght. Ft. Brass	8.276	7.452	6.769	6.081	5.538	4.242	3.335	2.523	2.166	1.808
	Wght. Ft. Copper	**8.702**	**7.836**	**7.117**	**6.394**	**5.823**	**4.460**	**3.507**	**2.653**	**2.278**	**1.901**
	Dec. Inch O. D.	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
4¾	**Dec. Inch I. D.**	**4.420**	**4.454**	**4.482**	**4.510**	**4.532**	**4.584**	**4.620**	**4.652**	**4.666**	**4.680**
	Wght. Ft. Brass	8.753	7.880	7.157	6.428	5.853	4.482	3.523	2.665	2.288	1.909
	Wght. Ft. Copper	**9.203**	**8.286**	**7.525**	**6.759**	**6.154**	**4.712**	**3.705**	**2.802**	**2.406**	**2.008**
	Dec. Inch O. D.	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
5	**Dec. Inch I. D.**	**4.670**	**4.704**	**4.732**	**4.760**	**4.782**	**4.834**	**4.870**	**4.902**	**4.916**	**4.930**
	Wght. Ft. Brass	9.230	8.308	7.544	6.775	6.168	4.722	3.711	2.807	2.409	2.011
	Wght. Ft. Copper	**9.705**	**8.736**	**7.932**	**7.124**	**6.486**	**4.965**	**3.902**	**2.951**	**2.533**	**2.114**
	Dec. Inch O. D.	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
5¼	**Dec. Inch I. D.**	**4.920**	**4.954**	**4.982**	**5.010**	**5.032**	**5.084**	**5.120**	**5.152**	**5.166**	**5.180**
	Wght. Ft. Brass	9.707	8.736	7.932	7.122	6.483	4.962	3.899	2.949	2.531	2.112
	Wght. Ft. Copper	**10.21**	**9.186**	**8.340**	**7.489**	**6.817**	**5.217**	**4.100**	**3.100**	**2.661**	**2.220**
	Dec. Inch O. D.	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
5½	**Dec. Inch I. D.**	**5.170**	**5.204**	**5.232**	**5.260**	**5.282**	**5.334**	**5.370**	**5.402**	**5.416**	**5.430**
	Wght. Ft. Brass	10.18	9.165	8.319	7.470	6.799	5.202	4.087	3.090	2.652	2.213
	Wght. Ft. Copper	**10.71**	**9.636**	**8.747**	**7.854**	**7.149**	**5.470**	**4.298**	**3.249**	**2.789**	**2.327**
	Dec. Inch O. D.	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
5¾	**Dec. Inch I. D.**	**5.420**	**5.451**	**5.482**	**5.510**	**5.532**	**5.584**	**5.620**	**5.652**	**5.666**	**5.680**
	Wght. Ft. Brass	10.66	9.593	8.707	7.817	7.114	5.442	4.275	3.232	2.774	2.314
	Wght. Ft. Copper	**11.21**	**10.09**	**9.155**	**8.219**	**7.480**	**5.722**	**4.495**	**3.398**	**2.916**	**2.433**
	Dec. Inch O. D.	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
6	**Dec. Inch I. D.**	**5.670**	**5.704**	**5.732**	**5.760**	**5.782**	**5.834**	**5.870**	**5.902**	**5.916**	**5.930**
	Wght. Ft. Brass	11.14	10.02	9.094	8.164	7.429	5.682	4.463	3.374	2.895	2.416
	Wght. Ft. Copper	**11.71**	**10.54**	**9.563**	**8.584**	**7.812**	**5.975**	**4.693**	**3.547**	**3.044**	**2.540**
	Dec. Inch O. D.	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	.....
6¼	**Dec. Inch I. D.**	**5.92**	**5.954**	**5.982**	**6.010**	**6.032**	**6.084**	**6.120**	**6.152**	**6.166**	.....
	Wght. Ft. Brass	11.62	10.45	9.482	8.511	7.745	5.922	4.651	3.516	3.017	.....
	Wght. Ft. Copper	**12.21**	**10.99**	**9.970**	**8.949**	**8.143**	**6.227**	**4.891**	**3.696**	**3.172**	.....

Seamless Brass and Copper Tubing

Weights Per Lineal Foot—Exact Outside Diameters and Corresponding Inside Diameters.

O.D. Inch	Gauge No. / Dec. Wall Thickness	8 .165	9 .148	10 .134	11 .120	12 .109	14 .083	16 .065	18 .049	19 .042	
6½	Dec. Inch O. D.	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	.....
	Dec. Inch I. D.	**6.170**	**6.204**	**6.232**	**6.260**	**6.282**	**6.334**	**6.370**	**6.402**	**6.416**	.....
	Wght. Ft. Brass	12.09	10.88	9.870	8.858	8.060	6.162	4.839	3.657	3.138	.....
	Wght. Ft. Copper	**12.72**	**11.44**	**10.38**	**9.314**	**8.475**	**6.479**	**5.088**	**3.845**	**3.300**	.....
6¾	Dec. Inch O. D.	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	.....
	Dec. Inch I. D.	**6.420**	**6.454**	**6.482**	**6.510**	**6.532**	**6.584**	**6.620**	**6.652**	**6.666**	.....
	Wght. Ft. Brass	12.57	11.30	10.26	9.205	8.375	6.402	5.027	3.799	3.260	.....
	Wght. Ft. Copper	**13.22**	**11.89**	**10.78**	**9.679**	**8.806**	**6.732**	**5.286**	**3.994**	**3.427**	.....
7	Dec. Inch O. D.	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	.....
	Dec. Inch I. D.	**6.670**	**6.704**	**6.732**	**6.760**	**6.782**	**6.834**	**6.870**	**6.902**	**6.916**	.....
	Wght. Ft. Brass	13.05	11.73	10.64	9.552	8.690	6.642	5.215	3.941	3.381	.....
	Wght. Ft. Copper	**13.72**	**12.34**	**11.19**	**10.04**	**9.138**	**6.984**	**5.484**	**4.144**	**3.555**	.....
7¼	Dec. Inch O. D.	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	.....	.....
	Dec. Inch I. D.	**6.92**	**6.954**	**6.982**	**7.010**	**7.032**	**7.084**	**7.120**	**7.152**	.....	.....
	Wght. Ft. Brass	13.53	12.16	11.03	9.899	9.006	6.883	5.403	4.082	.....	.....
	Wght. Ft. Copper	**14.22**	**12.79**	**11.60**	**10.41**	**9.469**	**7.237**	**5.682**	**4.293**	.....	.....
7½	Dec. Inch O. D.	7.50	7.50	7.50	7.50	7.50	7.50	7.50			
	Dec. Inch I. D.	**7.170**	**7.204**	**7.232**	**7.260**	**7.282**	**7.334**	**7.370**			
	Wght. Ft. Brass	14.00	12.59	11.42	10.25	9.321	7.123	5.591			
	Wght. Ft. Copper	**14.72**	**13.24**	**12.01**	**10.77**	**9.800**	**7.489**	**5.879**			
7¾	Dec. Inch O. D.	7.75	7.75	7.75	7.75	7.75	7.75	7.75			
	Dec. Inch I. D.	**7.420**	**7.454**	**7.482**	**7.510**	**7.532**	**7.584**	**7.620**			
	Wght. Ft. Brass	14.48	13.02	11.81	10.59	9.636	7.363	5.780			
	Wght. Ft. Copper	**15.22**	**13.69**	**12.42**	**11.14**	**10.13**	**7.742**	**6.077**			
8	Dec. Inch O. D.	8.00	8.00	8.00	8.00	8.00	8.00	8.00			
	Dec. Inch I. D.	**7.670**	**7.704**	**7.732**	**7.760**	**7.782**	**7.834**	**7.870**			
	Wght. Ft. Brass	14.96	13.45	12.20	10.94	9.952	7.603	5.968			
	Wght. Ft. Copper	**15.73**	**14.14**	**12.82**	**11.50**	**10.46**	**7.994**	**6.275**			
8¼	Dec. Inch O. D.	8.25	8.25	8.25	8.25	8.25	8.25	8.25			
	Dec. Inch I. D.	**7.92**	**7.954**	**7.982**	**8.010**	**8.032**	**8.084**	**8.120**			
	Wght. Ft. Brass	15.44	13.87	12.58	11.29	10.27	7.843	6.156			
	Wght. Ft. Copper	**16.23**	**14.59**	**13.23**	**11.87**	**10.79**	**8.246**	**6.472**			
8½	Dec. Inch O. D.	8.50	8.50	8.50	8.50	8.50	8.50	8.50			
	Dec. Inch I. D.	**8.170**	**8.204**	**8.232**	**8.260**	**8.282**	**8.334**	**8.370**			
	Wght. Ft. Brass	15.91	14.30	12.97	11.63	10.58	8.083	6.344			
	Wght. Ft. Copper	**16.73**	**15.04**	**13.64**	**12.23**	**11.13**	**8.499**	**6.670**			
8¾	Dec. Inch O. D.	8.75	8.75	8.75	8.75	8.75	8.75	8.75			
	Dec. Inch I. D.	**8.420**	**8.454**	**8.482**	**8.510**	**8.532**	**8.584**	**8.620**			
	Wght. Ft. Brass	16.39	14.73	13.36	11.98	10.90	8.323	6.532			
	Wght. Ft. Copper	**17.23**	**15.49**	**14.05**	**12.60**	**11.46**	**8.751**	**6.868**			
9	Dec. Inch O. D.	9.00	9.00	9.00	9.00	9.00	9.00	9.00			
	Dec. Inch I. D.	**8.670**	**8.704**	**8.732**	**8.760**	**8.782**	**8.834**	**8.870**			
	Wght. Ft. Brass	16.87	15.16	13.75	12.33	11.21	8.563	6.720			
	Wght. Ft. Copper	**17.73**	**15.94**	**14.45**	**12.96**	**11.79**	**9.004**	**7.065**			
9¼	Dec. Inch O. D.	9.25	9.25	9.25	9.25	9.25	9.25	9.25			
	Dec. Inch I. D.	**8.92**	**8.954**	**8.982**	**9.010**	**9.032**	**9.084**	**9.120**			
	Wght. Ft. Brass	17.34	15.59	14.13	12.76	11.53	8.803	6.908			
	Wght. Ft. Copper	**18.24**	**16.39**	**14.86**	**13.33**	**12.12**	**9.256**	**7.263**			
9½	Dec. Inch O. D.	9.50	9.50	9.50	9.50	9.50	9.50	9.50			
	Dec. Inch I. D.	**9.170**	**9.204**	**9.232**	**9.260**	**9.282**	**9.334**	**9.370**			
	Wght. Ft. Brass	17.82	16.01	14.52	13.02	11.84	9.043	7.096			
	Wght. Ft. Copper	**18.74**	**16.84**	**15.27**	**13.69**	**12.45**	**9.509**	**7.461**			
9¾	Dec. Inch O. D.	9.75	9.75	9.75	9.75	9.75	9.75	9.75			
	Dec. Inch I. D.	**9.420**	**9.454**	**9.482**	**9.510**	**9.532**	**9.584**	**9.620**			
	Wght. Ft. Brass	18.30	16.44	14.91	13.37	12.16	9.283	7.284			
	Wght. Ft. Copper	**19.24**	**17.29**	**15.68**	**14.06**	**12.78**	**9.761**	**7.659**			
10	Dec. Inch O. D.	10.00	10.00	10.00	10.00	10.00	10.00	10.00			
	Dec. Inch I. D.	**9.670**	**9.704**	**9.732**	**9.760**	**9.782**	**9.834**	**9.870**			
	Wght. Ft. Brass	18.78	16.87	15.30	13.72	12.47	9.523	7.472			
	Wght. Ft. Copper	**19.74**	**17.74**	**16.08**	**14.42**	**13.12**	**10.01**	**7.856**			

Inside Diameter Difference

To obtain the weight per foot of a tube specified INSIDE DIAMETER and Gauge, add the below listed correction to the weight per foot given in this table by Outside Diameter and Gauge.

Stubs Gauge	Weight Correction Brass	Copper
8	.630	**.662**
9	.507	**.533**
10	.416	**.437**
11	.333	**.350**
12	.275	**.289**
14	.159	**.168**
16	.098	**.103**
18	.056	**.058**
19	.041	**.043**
20	.028	**.030**
21	.024	**.025**
22	.018	**.019**
23	.014	**.015**
24	.011	**.012**
25	.009	**.010**
26	.008	**.008**
27	.006	**.006**
28	.005	**.005**
29	.004	**.004**
30	.003	**.004**
31	.002	**.002**

For weight of other metals multiply weight of Copper by

.95356 for Admiralty Metal
.90705 " Allegheny Metal.
.30279 " Aluminum.
.91950 " Beryllium Copper.
.98452 " Commercial Bronze.
.98142 " Duronze. (Silicon Bronze)
.98142 to 1.0062 for Monel Metal.
.97213 for Nickel Silver 18%.
.97832 " Nickel Silver 30%.
.87616 " Steel.
.94117 " Tobin Bronze.

Seamless Brass and Copper Tube. Iron Pipe Sizes.

Regular and Extra Heavy

Iron pipe sizes	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10
REGULAR																				
Brass, weight per lineal ft.	.246	.437	.612	.911	1.235	1.740	2.557	3.037	4.017	5.830	8.314	10.85	12.29	13.74	15.40	18.44	23.92	30.05	36.94	43.91
Copper, weight per lineal ft.	**.259**	**.459**	**.643**	**.957**	**1.298**	**1.829**	**2.689**	**3.193**	**4.224**	**6.140**	**8.751**	**11.41**	**12.94**	**14.46**	**16.21**	**19.41**	**25.17**	**31.63**	**38.83**	**46.22**
Exact outside diameter	.405	.540	.675	.840	1.050	1.315	1.660	1.900	2.375	2.875	3.500	4.000	4.500	5.000	5.563	6.625	7.625	8.625	9.625	10.750
Exact inside diameter	.281	.375	.484	.625	.822	1.062	1.368	1.600	2.062	2.500	3.062	3.500	4.000	4.500	5.063	6.125	7.062	8.000	8.937	10.019
Exact thickness of walls	.064	.083	.096	.1075	.114	.126	.146	.150	.157	.188	.219	.250	.250	.250	.250	.250	.283	.322	.340	.370
Brass, theoretical safe working pressure. Factor safety six	1776	1465	1160	1024	840	750	628	580	509	518	461	449	427	412	400	375	366	357	349	340
Copper, theoretical safe working pressure. Factor safety six	**1332**	**1102**	**870**	**798**	**630**	**563**	**471**	**435**	**381**	**391**	**346**	**337**	**320**	**309**	**300**	**281**	**275**	**267**	**261**	**255**
Internal area cross section	.057	.104	.192	.305	.533	.863	1.496	2.038	3.355	4.783	7.388	9.887	12.730	15.940	19.990	28.890	38.740	50.040	63.630	78.840
Thickness of walls at bottom of thread	.036	.040	.043	.048	.052	.059	.065	.070	.079	.096	.109	.118	.129	.139	.151	.172	.193	.214	.236	.258
EXTRA HEAVY																				
Brass, weight per lineal ft.	.353	.593	.805	1.191	1.622	2.386	3.300	3.986	5.508	8.407	11.24	13.67	16.41	20.07	22.52	31.32	41.23	47.02	52.81	59.32
Copper, weight per lineal ft.	**.371**	**.624**	**.847**	**1.253**	**1.706**	**2.509**	**3.460**	**4.191**	**5.791**	**8.839**	**11.82**	**14.37**	**17.25**	**21.10**	**23.67**	**32.93**	**43.34**	**49.42**	**55.56**	**62.40**
Exact outside diameter	.405	.540	.675	.840	1.050	1.315	1.660	1.900	2.375	2.875	3.500	4.000	4.500	5.000	5.563	6.625	7.625	8.625	9.625	10.750
Exact inside diameter	.205	.294	.421	.542	.736	.951	1.272	1.494	1.933	2.315	2.892	3.358	3.818	4.250	4.813	5.750	6.625	7.625	8.625	9.75
Exact thickness of walls	.100	.123	.127	.149	.157	.182	.194	.203	.221	.280	.304	.321	.341	.375	.375	.437	.500	.500	.500	.500
Brass, theoretical safe working pressure. Factor safety six	4442	3401	2508	2166	1739	1500	1250	1142	1006	991	904	846	814	873	.763	.740	.....	.....	.....	.....
Copper, theoretical safe working pressure. Factor safety six	**3318**	**2551**	**1881**	**1625**	**1302**	**1125**	**938**	**857**	**755**	**743**	**678**	**635**	**611**	**700**	**578**	**555**	.....	.....	.....	.....
Internal area cross section	.033	.068	.139	.231	.452	.710	1.271	1.753	2.935	4.209	6.569	8.856	11.450	14.180	18.190	25.960	.....	.....	.....	.....
Thickness of walls at bottom of thread	.068	.075	.079	.088	.096	.107	.119	.128	.146	.172	.196	.213	.233	.....	.267	.329	.....	.....	.....	.....
Number of threads per in.	27	18	18	14	14	11½	11½	11½	11½	8	8	8	8	8	8	8	8	8	8	8
Approximate length of threads, inches	⅜	½	½	⅝	¾	⅞	1	1	1⅛	1¼	1¼	1⅜	1⅜	1½	1½	1½	1½	1½	1½	1½

Note: Weights are in pounds, diameters and thicknesses in inches, areas in square inches. The safe working pressure is calculated on thickness of walls at bottom of thread and indicates pounds per square inch internal pressure. These weights are theoretically correct, but variations must be expected in practice.

Fabrication of Allegheny Stainless Steels
FABRICATING THE AUSTENITIC GROUP

Allegheny Metal, A, B and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44

(Chromium-Nickel Stainless Steels)

Effect of Welding on Corrosion Resistance

When the steels of this group are subjected to temperatures in the range of 800° to 1500°F, inclusive, a change takes place which makes them less resistant to some corroding media. It is now generally accepted that this change is the precipitation of carbides at the grain boundaries. The magnitude of this change will depend upon the length of time that these steels are held in the above temperature range, and upon the composition of the steel. All steels of this type will precipitate carbide at the grain boundaries if held for a long enough time in the temperature range given above. Since the time that the steel is held within this range of temperature in the welding operation is short, compositions can be selected which will sufficiently retard the precipitation of carbide and which may be used for many applications without annealing after the welding operation.

There are many applications, however, where the corrosion medium encountered is mild, such as in atmospheric exposures where the precipitation of carbide does not in any way affect the corrosion resistance of the steel and for these applications, a specially selected composition is not necessary.

The carbide precipitation which takes place during the welding operation, does not necessarily impair the value of the material. Unless the metal is in contact with an active corrosive agent the presence of this carbide does not affect the life of the equipment, and in many applications in which the corrosive media encountered is mild, equipment which is welded and not annealed after welding will give perfect service. When, however, welded equipment is to be subjected to an active corrosive medium it should be annealed after welding, or fabricated from a material of selected composition which will retard the precipitation of carbides during the welding operation. In case the equipment can be annealed after welding, the composition is relatively unimportant.

There are a number of applications in which annealing is absolutely necessary after the welding operation, even though steels of welding quality are used. Unless the fabricator has had sufficient service experience he should consult the Allegheny Steel Company when selecting the proper grade of material to use and also, when determining if annealing is necessary after the welding operation.

Welding

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

All of these steels may be welded by any of the electric methods such as: the metallic arc, carbon arc, resistance, seam or butt, spot, line, atomic hydrogen or the alternating current arc for gauges lighter than 16 (.062). The oxy-acetylene method may also be used.

To the welder experienced in the welding of steel, better results will undoubtedly be obtained if some of the physical characteristics of these steels are pointed out. The coefficient of expansion of the steels of this group is 50% greater than mild steel, and the thermal conductivity is about 50% less. Their electrical resistance in the fully annealed condition is about 6 times that of mild steel, and when these steels are heavily cold worked it increases to about 12 times.

The melting point of these alloys is slightly less than the melting point of mild steel.

In the annealed condition these alloys are non-magnetic, but when heavily cold worked become feebly magnetic. Cold working, however, increases their strength rapidly, so that tensile strength in excess of 250,000 lbs. per square inch may be obtained, on cold rolled strip, cold drawn wire, etc.

While sound ductile welds are readily made by any of the above mentioned methods the electrical weld is preferable, because it is much faster and the heat does not travel as far into the body of the plate or sheet. Electric welding avoids carbon pickup and undue warping or buckling.

Oxy-Acetylene Welding

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

When welding these steels by the oxy-acetylene method the following precautions should be observed:

No. 1—Be sure the parts to be welded are clean.

No. 2—Use jigs and chill plates (copper best).

No. 3—Use tip one or two sizes smaller than for the same gauge of steel.

No. 4—Use an uncoated welding rod of approximately the same composition as the parts to be welded.

No. 5—A soft slightly reducing flame should be used covering the weld at all times, to exclude the air and prevent oxidation. If the flame is oxidizing it will produce a porous weld; if it is reduced too much, it will build up the carbon in the deposited weld metal to a point where failure may occur either from embrittlement or corrosion.

No. 6—Point the flame in the direction of the weld. Do not puddle, as puddling may cause a porous weld.

No. 7—For some designs preheating is an advantage. When necessary, preheat to 300-400°F.

No. 8—If necessary to "tack," it should be done every inch on 20 gauge or lighter, but not to exceed 2 inches on heavier gauges.

Metallic Arc Welding

DIRECT CURRENT

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

No. 1—Be sure the parts to be welded are clean.

No. 2—Reverse Polarity, the work to be negative and the welding rod positive.

No. 3—Use a low carbon filler rod coated with a non-carbonaceous flux with the chromium and nickel sufficiently high to compensate for evaporation losses so that the deposited metal will be of approximately the same composition as the parts to be welded.

No. 4—Use jigs and chill plates when required. (Copper recommended).

No. 5—Scarfing is desirable on gauges heavier than No. 10 (.140).

No. 6—Use only sufficient power in-put to maintain a medium to short arc.

No. 7—On gauges heavier than 14 (.078) where the bead is to be ground off flush on one side, better results are obtained by flowing a light bead on the side to be ground off, followed by a heavier bead on the opposite side, rather than to use excessive power in-put, with a one side weld, as excessive power in-put with extreme penetration is liable to produce a porous weld.

No. 8—Best results are obtained by arranging the work so that the welding is done in the direction the current is flowing.

No. 9—Do not puddle, as porous welds will result.

No. 10—When striking an arc in continuing a weld, removal of the oxide from the previously deposited weld metal will preclude the possibility of pin holes. This may be accomplished by the use of a heavy wire brush, or better still by the use of a small electric or air grinder. On heavy work, where it is necessary to lay several beads, one upon the other, extreme care should be used to remove the oxide formed on the first bead before laying the second to assure sound, porous free welds.

Alternating Current Arc Welding

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

The same general technique applies as for metallic arc welding. This type of weld is only recommended on 16 gauge (.062) or lighter.

Up until quite recently fabricators were forced to gas weld gauges lighter than No. 16, as this was the lightest gauge commercially practical for metallic arc welding. There are now available, however, alternating current arc welding machines that are suitable for welding No. 16 gauge down as light as No. 26 gauge (.018). They are faster and there is no danger of carbon pick-up.

Electrical Resistance Welding

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

Because of their extremely high electrical resistance these steels are ideal for welding by the spot, seam, and roll or line welding methods.

For this type of welding it is necessary to have clean, grease-free metal and good contact between the pieces. Due to the greater strength of these steels it will be found necessary to use greater pressure than in welding ordinary mild steel. Considerably less power in-put is necessary than with steel due to the higher electrical resistance.

Clean metal, sufficient pressure to insure a good metal contact, proper power in-put, correct area of points and correct timing are the requisites for perfect welds of this type. By experimenting with small pieces the conditions necessary for perfect welding can be readily obtained. For many types of work plain copper for the point or roll is satisfactory, while for other types special copper alloys will be found to stand up better under the pressures necessary.

There has recently been placed on the market a vacuum tube control unit which has many advantages over the mechanical or solenoid breakers generally used, and produces a better and more uniform weld.

The electrical resistance type of welding is strongly recommended wherever possible, as the welds are perfectly sound and it is much faster than other methods, therefore, cheaper. The greatest saving, however, is in the removal and finishing of the bead, which requires practically no labor in comparison with the labor required to remove the bead produced by arc or gas welding.

Removal of Welding Scale

When these metals are used primarily for corrosion resistance and the equipment is not to be operated within the scaling range of temperatures, it is most essential that the scale produced on the surface of the metal in the welding operation be completely removed in order to avoid the possibility of local corrosion due to electrolysis. This removal may be accomplished by any approved method such as sand blasting, pickling, wire brushing, or grinding. Wire brushes should be made of stainless steel, and grinding wheels should be as near as possible iron free. Care should also be taken to remove any spatters which may result from the welding operation.

Removal of Welding Beads

When it is necessary to remove the bead left by the welding operation, grinding is preferable. The rough grinding is best accomplished by the use of a rubber bonded wheel used at correct speed. This speed is higher than that used on the old type hard wheel and care should be taken to see that manufacturer's recommendations are followed. The intermediate grinding and polishing may also be done with the same type of wheel or with the special new type wheel which uses emery cloth strips for grinding and polishing.

There is also on the market a small wheel operated by an exceedingly high speed air motor, which is excellent for getting into corners, etc., an almost impossible job with the conventional type of wheel.

In addition there are available flexible shaft machines using different types of wheels, discs, etc.

The grinding should be carried out in such a manner, that temperatures in excess of 400°F. are not reached. If the temperatures reached are in excess of 400°F. the metal will become heat tinted and buckling is likely to occur.

For the final polish on the area ground to remove the welding bead a new type of "flap wheel" is excellent to use as it tends to blend the two surfaces. More uniform results can be obtained by going over the entire surface area of the welded unit with a flap wheel assuming of course, that a polished sheet or plate has been used.

Any of the manufacturers of grinding and buffing equipment will give complete information as to the proper grinding wheels to use and the best types of lubricant, etc., to match various finishes.

Annealing and Pickling

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

No. 1—Remove thoroughly all grease from the piece to be annealed.

No. 2—Use a muffle or semi-muffle type of furnace.

No. 3—Annealing temperature 1850° to 2000°F. usually suffices.

No. 4—The time of annealing will depend upon the temperature used and the section of the steel. The work should be brought up to temperature uniformly. Sections of from ¼ to ½ inch thick should be held at 1850° for ½ hour, while at 1950° and above the time required is from 3 to 5 minutes.

No. 5—Cool rapidly. Usually air cooling is sufficiently rapid, although heavy sections (¼ inch and heavier) may require an air blast, water quench or water spray. These steels should cool to below a red temperature in less than three minutes.

No. 6—Never allow a direct flame to come in contact with the steel.

No. 7—The oxide formed by annealing should be removed. This may be done by either sand-blasting or pickling, preferably the latter. In sand-blasting, care should be exercised to eliminate iron particles in the blast which would tend to become imbedded in the surface of the metal, and cause corrosion and discoloration.

No. 8—Pickling: Use either 25% by volume 38° Baume nitric acid and 2% hydrofluoric acid, or 20% nitric acid and 2% hydrochloric acid. These solutions should be heated to a temperature of 140° to 180°F.

The first formula which contains hydrofluoric acid attacks the metal much less than the second one, and as a rule produces a whiter pickle. The second formula gives a finish of a higher luster but produces a heavy loss of metal.

The facility with which the article can be pickled by either of these formula will depend to a large extent on the previous anneal. If the anneal which precedes the pickling operation is done in an atmosphere as nearly neutral as possible, the process of pickling will be much easier. A slightly reducing atmosphere is preferable to a slightly oxidizing one.

For the ordinary white pickle finish the following is recommended: 10% by weight of 60° Baume sulfuric acid and 7% by weight rock salt, at a temperature of 140 to 180°F., or 25% by volume 20° baume muriatic acid at temperatures 140 to 180°F.

It is necessary to agitate either the bath or the work and scrub off the loose oxide.

After pickling and scrubbing, wash immediately in hot water.

Shearing

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

In shearing, about twice the amount of power commonly used for mild steel is required. The shear knives must be sharp and closely adjusted or the metal will be drawn over the bottom knife and work hardened before the shearing or cutting actually begins, thereby making the steel harder to cut. Drawing the metal over the edge work hardens it rapidly, throwing undue strain on the blades. As a result of work hardening due to compression before the actual shearing begins, a certain amount of shearing strain is unavoidable. The shearing of these steels differs from that of ordinary steels, in that ordinary steel is cut only 25 to 75% of the way through and then breaks. These steels have to be cut all the way through; they do not break off.

The estimate of twice the usual power for shearing these steels allows for a safety factor for blades that are not properly adjusted. There are shears designed for shearing ¼" thick steel that can handle 3/16" Allegheny Metal, but this requires exact and careful adjustment of blades, and proper sharpening.

Blanking and Punching

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

It is necessary in blanking and punching operations to keep a neat clearance between the punch and the die diameter regardless of the thickness of the material. If the clearance is too great the metal will be drawn over the edge, work harden it and bring excessive strain on the tools and the punch press. The standard punches and dies used in punching ordinary steels have a clearance that is too great for this group of stainless steels. Standard punches and dies for use on steel can be used on the lighter gauges; below 20 gauge. For heavier gauges it is desirable, if not necessary, to have special punches and dies. These should be ordered with neat fit.

Gang punches are hard to operate because it is difficult to maintain the proper clearance. Gang punching can be carried out if the tools are in proper condition to hold a very close adjustment. About twice the power is required as for mild steel.

The "stripper" attachments should be heavier than is used for ordinary steel.

Forming and Drawing

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

These stainless steels are stiffer than ordinary steel and they work harden to a much greater extent in the drawing operation. For this reason it is necessary to use a lubricant with a sufficiently heavy body to stand up under the higher temperatures and pressures encountered.

The best drawing compound for heavy gauge material is white lead thinned down with linseed oil to about the consistency of a 600W engine oil. Most of the standard drawing compounds will work satisfactorily provided they are mixed to the proper consistency which is about that indicated in the case of white lead.

These stainless steels flow differently than regular deep drawing steel. The slower the press speed the less work hardening will result, and the deeper the draw that can be made in one operation. That it is preferable to use the slower speed is axiomatic in drawing all metals, but this is more important with the type of steel which work hardens rapidly.

In deep drawing operations a greater clearance can be used between the punch and the die than with mild steel. The reason for this is the difference in the flow of the metal as compared with mild steel, just the reverse of the case in shearing, blanking and punching. A larger radius on the draw ring may be used, the radius depending on the thickness of the metal, the speed of the press, the type of blank holder used and the shape of the piece.

In addition to the above, it is necessary to observe the same precautions that are taken in the drawing of mild steel. The adjustment of the machine and the punch and die is of vital importance. Rough dies frequently cause unsatisfactory results. The use of a drawing compound not sufficiently heavy to prevent drag, frequently results in "wiring" the dies, breaking the piece and making stoning of the dies necessary before they can be used in further drawing operations. Allegheny 22 and Allegheny 44 and Allegheny 2520 will require slightly more power in the drawing operation than Allegheny Metal.

Before the parts which have been drawn are annealed they should be thoroughly freed from all grease. Failure to do this will result in pitting and carburization of the surface which will lessen its corrosion resistance.

There are many cleaners on the market which can be successfully used. Sodium meta-silicate, at a temperature of 160 to 200°F. works very well, the strength of the solution depending on the kind and amount of drawing compound on the pieces to be cleaned.

Electrolytic cleaning can also be used to advantage.

Drilling

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

Drilling should be done with a high speed drill. The best results are obtained when the drill is ground slightly flatter than the standard. The laying out should be done with a triangular nose center punch, using care not to mark the work deeper than is necessary, since this will cause the piece to work harden and make it difficult to start the drill.

Because these steels work harden it is necessary to exert sufficient pressure on the drill to insure continuous cutting.

Unlike ordinary steel, these alloys do not chip or break out ahead of the cutting point. The drilling must be done all the way through. The metal should be backed up in a manner that will permit the drill to cut all the way through without pushing the steel away from the drill point, as under these conditions the drill will become very hot and the drill point will be burned. A cast iron backing plate has been found most satisfactory.

The speed of the drill should be about one-half that used in drilling mild steel. Immersing the tool in water after each hole is drilled will considerably increase the life of the drill.

With proper care no particular difficulties will be encountered in drilling except with the older type of electric hand drill, where it is impossible to reduce the speed. The high speed of this drill tends to build up temperature very rapidly, burning the point of the tool. Several manufacturers have recently brought out low speed electric hand drills and these will be found to work very much better with this group of steels. If the speed of the hand drill cannot be reduced, it is advisable to spot the drill before applying the power, and to make sure that when the power is turned on, pressure is being exerted so that the drill will cut. If the drill is allowed to make a few revolutions without cutting, it work hardens the steel, and this may be sufficient to render drilling by this method impossible. When drilling deep holes, the use of a compound made up of one pound of sulphur to one gallon lard oil will prove advantageous.

Sawing

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

High speed hack-saw blades with a wavy tooth give the best results. For sawing comparatively light gauges, 32 teeth to the inch is very satisfactory. For heavier material such as bars, etc., blades with fewer teeth to the inch will be found more satisfactory and the recommendations of the hack-saw blade manufacturers should be followed. Care should be taken not to exceed the speed recommended by the manufacturer, since high speed may cause the temperature to become sufficiently high to draw the temper from the teeth of the blade, rendering it useless.

Machining

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

The machining of these steels is best done at a speed of about one-half that used on same job where mild steel is used. The tools should be ground to the same clearance as is used in machining dead soft brass because these steels, like dead soft brass, have a tendency to drag. It is necessary to make the tool cut at all times, because if allowed to ride, it will work harden the steel, making it harder to machine. These remarks apply particularly to lathe and shaper work. In threading, the design of the tool largely determines how clean the thread will be cut, and it has been found that a design of tool very similar to that used for threading soft brass should be used. In tapping, a tap used for dead soft brass with slightly more taper and having only two or three full teeth works best.

Where it is necessary to use a lubricant, it has been found that a mixture composed of 40 gallons of water, 10 gallons of lard oil, and 2½ lbs. of 58% soda ash works well. The tool upkeep on the ordinary machining operation will very likely run two to three times that in machining mild steel.

Although these steels are more difficult to machine than mild steel, they are being successfully machined on automatic machines by many fabricators. For this work these steels machine best when the hardness is between 200 and 240 Brinell.

Spinning

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

These steels are much more difficult to spin than copper, aluminum, brass, etc. The speed should be cut down to one-half to one-fourth that used for spinning copper. Much greater power will be required and it has been found that many of the spinning lathes do not have large enough belt area to pull the load. The lubricant used has a decided bearing on successful spinning. White lead and linseed oil mixed to the consistency of a medium bodied paste gives the best results. To prevent tearing of the metal it is necessary to have a lubricant heavy enough in body to withstand the high temperature encountered. The best type of spinning tool is hardened steel of about the same design as is used in the spinning of copper, except that it is desirable wherever possible to have the tool slightly flatter so as to present a greater bearing surface. This applies when either the spinning bar or roll is used.

While these steels have very high ductility it is not possible to spin them in one operation to anything like the depth to which copper is spun, since copper, in addition to having high ductility does not work harden to the same degree. It is therefore, necessary to use good judgment in the amount of work put on the piece before annealing and it will be found necessary to anneal at more frequent intervals. Before annealing the article should be thoroughly cleaned and degreased and after annealing same should be pickled.

A spun shape is often required to duplicate a shape in copper, aluminum or other metal. In such cases it will frequently be found that while these steels are spun over the same forms that give a perfect shape in copper, the spun article will not conform exactly to the shape and dimension of the copper piece. This is not only due to the higher physical properties of these steels but also to the fact that they do not flow in the same manner as copper. It will therefore, in many cases be found necessary to change the contour of the spinning form in order to produce in the steel a duplicate of the piece in copper.

Because these steels increase very rapidly in strength under cold working, care should be taken that the spinning operation is not carried too far before annealing, or the strain set up by the cold working may be great enough to crack the piece.

Riveting

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

These steels may be either cold or hot riveted. Cold riveting is recommended only for sizes less than 3/16 inches and it is further suggested that the rivet be set up in one blow, because of the work hardening properties of the steel.

Hot riveting should be done at temperatures between 1900° and 2100°F. and finished above 1600°F. If the work is to be exposed to severe corrosive conditions it should be annealed after riveting as described under the heading "Annealing."

Brazing

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

Brazing of these alloys is not recommended, as a marked decrease in corrosion resistance, and embrittlement is very likely to occur.

Soft Soldering

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

These alloys can be soldered if certain precautions are taken to get proper penetration of the solder. In the polished condition they are quite resistant to hydrochloric acid, which is the base of most of the soldering fluxes. While there are a number of special fluxes on the market, we have found that the best results are obtained by the use of an uncut muriatic acid, allowing the acid to remain at least one minute on the surface which is to be soldered and preferably for several minutes to give it ample time to etch the surface of the metal. After the surface has been etched, satisfactory results may be obtained by the use of the regular cut acid. Better results, however, are obtained by the use of a good soldering salt. Since these steels have a much lower thermal conductivity than wrought iron it is necessary to use a larger iron than would be used when soldering steel, copper, and other metals which have considerably higher thermal conductivity, and a little longer time is required to bring the metal to be soldered up to the temperature where the solder will flow. Care should be used not to have the solder at too high a temperature as embrittlement is likely to occur.

When these steels in sheet form are soldered, buckling is likely to occur because of their high coefficient of expansion, about one and one-half times that of mild steel. To prevent buckling it is sometimes necessary to use chill plates, preferably of copper, which will keep the temperature from extending out over the surface of the sheet.

Immediately after soldering it is necessary to inhibit any further action of the acid in the flux by washing thoroughly with ammonia water or with water in which has been dissolved a liberal amount of yellow laundry soap and ordinary soda. If this is not done, the acid will continue to etch the steel, cause discoloration and perhaps some pitting.

Because of the fact that these steels have very high physical properties, and a very high expansion coefficient, it is desirable not to depend on the solder for anything except a tight joint. Generally speaking, soldering should be avoided, but where necessary, it is best to obtain the required strength of the joint by riveting or spot welding. It has been found that in most cases lock seamed and soldered joints do not remain tight over a long period of time, due primarily to the fact that in lock-seaming it is generally impossible to have the lock-seamed joint itself, perfectly tight. Compare these steels to copper. Copper when turned over in a lock seam will lie perfectly flat, whereas these steels, due to their much higher physical properties and their work hardening characteristics, tend to spring back slightly with the result that after the solder has been applied, even though good penetration has been obtained, the constant expansion and contraction, in service, will tend to break the solder away from the metal. In many cases where soldered joints were tried out and proved unsatisfactory, the fabricator has found that an electric roll or stitch weld, that is, an intermittent or continuous spot weld, is solving this problem.

There is a special solder now available, which gives very good results. It is in the form of an amalgam and no flux is necessary. The initial melting point is considerably lower than in ordinary solders, and once set, a higher temperature is required to melt it. It has greater strength than the ordinary solders.

Silver Soldering

Allegheny Metal, A, B, and C, MO, TI, Free Machining, Allegheny 2520, 22 and 44.

Silver soldering is readily accomplished with these steels either steel to steel, or steel to copper. A flux made up of potassium acid-fluoride and borax works well and the manufacturers of silver solders have developed various fluxes for the different types of solder.

In silver soldering copper to these alloys it is desirable to direct the flame only on the copper and get the heat into the joint by conduction. By this method sounder joints will be made.

It requires greater skill on the part of the operator to silver solder steel to steel. Preheating to a slight extent the areas immediately adjacent to the joint is recommended.

To remove the flux remaining on the steel after the soldering operation, a small high pressure steam jet is recommended. Remove the flux immediately after the soldering is done.

These instructions cover the Austenitic (Chromium-Nickel) group only. Special instructions will be supplied on request for fabricating the straight Chromium Stainless Steels.

Properties of ALLEGHENY Stainless and Heat Resisting Steels

Material in ANNEALED condition unless otherwise stated.

Composition and Physical Properties	Allegheny Metal (18 & 8)	Allegheny 44	Allegheny 2520
Stainless Type No. (Representative Composition) [1]	302[1]	309	310
Composition (Representative) Chromium	17 to 19%[1]	22 to 26%	24 to 26%
Nickel	7 to 9%[1]	11 to 15%	19 to 21%
Structure Group	Austenitic	Austenitic	Austenitic
Specific Gravity	Hot Rolled Annealed 7.86 to 7.94 Cold Rolled Annealed 7.97 to 8.07	7.86 to 7.94	7.86 to 7.94
Melting Point, Degrees Fahrenheit	2606 to 2679	2552 to 2597	2550 to 2590
Specific Heat, mean between 20°C and 1000°C (Calories per gram per degree centigrade)	.118	0.142 (35° to 1000°C)	0.142 (35° to 1000° C)
Thermal Conductivity (a) Compared to Iron	48%	28%	28%
(b) Calories per cubic centimeter per second per degree Centigrade between 20° and 100°	0.069	0.039	0.039
Coefficient of Linear Expansion:			
(a) Between 20° and 100°C per degree C, mean	.0000173	.0000162	.000015
(b) Between 20° and 1000°C per degree C, mean	.0000202	.0000202	.000018
Electrical Resistivity, at 20°C, ohms per cubic centimeter	69×10^{-6}	75.5×10^{-6}	
Electrical Conductivity, at 20°C, mhos per cubic centimeter	14,480	13,240	
Magnetic Permeability, maximum	1.02 (Soft Annealed) 8.57 (Hard Rolled)	1.02 (Soft Annealed)	1.02 (Soft Annealed)
Mechanical Properties at Room Temperature			
Modulus of Elasticity (Tension), Lbs. Per Sq. Inch	28,600,000 (Annealed) to 22,000,000 (high tensile)	29,000,000 (Annealed) to 22,000,000 (high tensile)	29,000,000 (Annealed) to 22,000,000 (high tensile)
Proportional Limit, Lbs. Per Sq. Inch	20,000 to 200,000 (Annealed[2] to high tensile)	28,000 to 35,000 (Annealed) to 200,000 high tensile	28,000 to 35,000 (Annealed)
Yield Point, Lbs. Per Sq. Inch	40,000 (annealed[2]) to 250,000 (cold drawn wire)	45,000 (Annealed) to 225,000 (cold drawn wire)	45,000 to 60,000 (Annealed)
Ultimate Tensile Stress, Lbs. Per Sq. Inch	80,000 (annealed[2]) to 300,000 (cold drawn wire)	90,000 (Annealed) to 270,000 (cold drawn wire)	90,000 to 110,000 (Annealed)
Elongation in 2"	48 to 60%	35 to 60%	45 to 60%
Reduction of area	55 to 70%	55 to 70%	50 to 60%
Brinell Hardness Number	135 to 185 (Annealed) to 460 (Cold Drawn)	150 (Annealed) to 380 (cold drawn)	150 to 200 (Annealed)
Rockwell Hardness Number	75 to 80 B (Annealed) to C 47 (Cold Drawn)	B 80 (Annealed) to C 40 (cold drawn)	B 80 to B 95 (Annealed)
Charpy Impact Strength, foot pounds [4]	100 to 110 (Annealed)	35 to 70 (Annealed)	35 to 70 (Annealed)
Izod Impact Strength, foot pounds	115 to 120 (Annealed)		
Endurance Limit (Fatigue), Lbs. per Sq. Inch	32,000 to 38,000 (Annealed) (Rises with cold Working)		
Erichsen value, millimeters	11 to 15		
High Temperature Properties			
Initial Forging Temperature, Degrees F. [5]	2100 to 2200	2150 to 2250	2150 to 2250
Finishing Forging Temperature, Degrees F. [5]	Not under 1700	Not under 1700	Not under 1700
Annealing Temperatures, Degrees F. [5]	1850 to 2000. Cool rapidly.	1850 to 2100. Cool rapidly.	1850 to 2100. Cool rapidly.
Heat Treatment Properties	Cannot be hardened by heat-treatment. High tensile properties obtained by cold working.	Cannot be hardened by heat-treatment.	Cannot be hardened by heat-treatment.
Resistance to High Temperature Scaling, oxidizing atmosphere, maximum temperature recommended for [3]			
Continuous Service, degrees F.	1650[7]	2000	2200
Intermittent Service, degrees F.	1450[7]	1750	2200
Stress causing 1% Flow (Creep) in 10,000 hours [6]			
Pounds per Sq. Inch, at 1000°F	14000	16,000	16,000
Pounds per Sq. Inch, at 1200°F	6000	7,000	7,000
Pounds per Sq. Inch, at 1500°F	850	900	1,000

Notes: 1. For **Representative Analysis** only. Modifications with varying amounts of chromium, nickel, or carbon, or by the addition of other alloys such as molybdenum, tungsten, copper, columbium, etc., may radically influence properties. Special data available on request.

2. Physical properties of ALLEGHENY METAL can be greatly varied by variations in chromium, nickel and carbon content, by additions of other alloys and by cold work.

3. Resistance to oxidation at elevated temperatures is greatly affected when accompanied by high thermal expansion. Intermittent heating and cooling results in surface checking, cracking and scaling in materials of high thermal expansion. Atmospheres must also be considered. The intricacies of behavior require technical consideration.

4. Impact strength varies both with analysis and condition of thermal or mechanical treatment.

5. Certain precautions must be observed in rate of heating, time at temperature, forging procedure, rate of cooling, etc. Special data available on request.

6. Considerable variation exists in the creep stress values reported by various investigators. The values given here are **conservative.**

7. ALLEGHENY METAL is not recommended for use in corrosive atmospheres at high temperatures (800 to 1650°F.).

8. Values in this table are based on rolled material.

Data compiled by S. Craig Alexander, Allegheny Steel Co., 1936.

Properties of ALLEGHENY Stainless and Heat Resisting Steels

Material in ANNEALED condition unless otherwise stated.

Composition and Physical Properties	Allegheny 33	Allegheny 66	Allegheny 55
Stainless Type No. (Representative Composition) (1)	410(1)	430(1)	446
Composition (Representative) Chromium	12 to 14% (1)	16 to 18% (1)	23 to 30%
Nickel	None	None	None
Structure Group	Martensitic-Ferritic	Martensitic-Ferritic	Ferritic
Specific Gravity	7.75 to 7.779	7.65 to 7.75	7.58 to 7.62
Melting Point, Degrees Fahrenheit	2710 to 2720	2710 to 2720	2700 to 2715
Specific Heat, mean between 20°C and 1000°C (Calories per gram per degree centigrade)	0.159	0.152	0.146
Thermal Conductivity (a) Compared to Iron	67%	57%	41%
(b) Calories per cubic centimeter per second per degree Centigrade between 20° and 100°	0.096	0.082	0.059
Coefficient of Linear Expansion:			
(a) Between 20° and 100°C per degree C, mean	.0000102	.0000105	.0000106
(b) Between 20° and 1000°C per degree C, mean	.0000128	.0000132	.0000134
Electrical Resistivity, at 20°C, ohms per cubic centimeter	58.2 to 63.3x10^{-6}	60 to 70x10^{-6}	63.8x10^{-6}
Electrical Conductivity, at 20°C, mhos per cubic centimeter	15,790 to 17,190	14,280 to 16,660	15,700
Magnetic Permeability, maximum	1,600 (soft annealed)	380 (soft annealed)	390 (soft annealed)
Mechanical Properties at Room Temperature			
Modulus of Elasticity (Tension), Lbs. Per Sq. Inch	29,800,000 (Annealed)	29,000,000 (Annealed)	29,400,000 (Annealed)
Proportional Limit, Lbs. Per Sq. Inch	28,000 (Annealed)	30,000 (Annealed)	30,000 (Annealed)
Yield Point, Lbs. Per Sq .Inch	Rises with Yield & Ultimate 40,000 to 50,000 (Annealed) to 160,000 (Heat Treated)	40,000 to 55,000 (Annealed)	45,000 to 60,000 (Annealed)
Ultimate Tensile Stress, Lbs. Per Sq. Inch	72,000 to 85,000 (Annealed) to 175,000 (Heat Treated)	70,000 to 85,000 (Annealed)	75,000 to 100,000 (Annealed)
Elongation in 2"	32 to 37% (Annealed) to 15% (Heat Treated)	20 to 35% (Annealed)	25 to 35% (Annealed)
Reduction of area	70 to 78% (Annealed) to 60% (Heat Treated)	60 to 70% (Annealed)	45 to 65% (Annealed)
Brinell Hardness Number	140 to 170 (Annealed) to 340 (Heat Treated)	140 to 175 (Annealed)	160 to 200 (Annealed)
Rockwell Hardness Number		75 to 85B	80 to 90B
Charpy Impact Strength, foot pounds (4)	55.4 (Annealed) to 15.5 (Hot Rolled)		
Izod Impact Strength, foot pounds	20 to 40 (Hot Rolled) 60 to 100 (Annealed) 20 to 120 (Heat Treated)	4 to 80 dependent upon Heat Treatment	Low
Endurance Limit (Fatigue), Lbs. per Sq. Inch	35,000 (Annealed). Can be increased by heat treatment.		
Erichsen value, millimeters		8 to 9	
High Temperature Properties			
Initial Forging Temperature, Degrees F. (5)	2,000 to 2,100	2,000	1,900 to 2,000
Finishing Forging Temperature, Degrees F. (5)	Not under 1,500	Not under 1,500	Not under 1,500
Annealing Temperatures, Degrees F. (5)	1,400 to 1,500. Cool slowly.	1,450 to 1,550. Cool slowly.	1,550 to 1,650. Cool rapidly.
Heat Treatment Properties	Subject to considerable modification by variation in thermal and mechanical treatment. Special data available.	Subject to modification by variation in thermal and mechanical treatment. Special data available.	Non-hardening. In the absence of grain growth, to remove brittleness heat to above 1,200°F, and cool rapidly. Preferably, water quench.
Resistance to High Temperature Scaling, oxidizing atmosphere, maximum temperature recommended for (3)			
Continuous Service, degrees F.	1,500	1,600	2,100
Intermittent Service, degrees F.	1,500	1,600	2,100
Stress causing 1%, Flow (Creep) in 10,000 hours (6)			
Pounds per Sq. Inch, at 1000°F.	5,800	5,500	6,000
Pounds per Sq. Inch, at 1200°F.	1,500	1,250	1,000
Pounds per Sq. Inch, at 1500°F.			150

Notes: 1. For **Representative Analysis** only. Modifications with varying amounts of chromium, nickel, or carbon, or by the addition of other alloys such as molybdenum, tungsten, copper, columbium, etc., may radically influence properties. Special data available on request.

3. Resistance to oxidation at elevated temperatures is greatly affected when accompanied by high thermal expansion. Intermittent heating and cooling results in surface checking, cracking and scaling in materials of high thermal expansion. Atmospheres must also be considered. The intricacies of behavior require technical consideration.

4. Impact strength varies both with analysis and condition of thermal or mechanical treatment.

5. Certain precautions must be observed in rate of heating, time at temperature, forging procedure, rate of cooling, etc. Special data available on request.

6. Considerable variation exists in the creep stress values reported by various investigators. The values given here are **conservative.**

8. Values in this table are based on rolled material.

Data compiled by S. Craig Alexander, Allegheny Steel Co., 1936.

Mixtures of Metals

Note.—The following mixtures comprise a large variety of special alloys, such as Eyelet Brass, Block Rule, Watch and Engravers' Brass, Platers' Bars, Rich Low Brass, Gilding, Coe Bronze, Tobin Bronze, Roman Alloy, Oreide, Cupro-Nickel, etc., which are designed to meet some special requirement as to color or usage. Although all of these mixtures cannot be made to cut freely, they can be so alloyed as to improve their drilling or cutting qualities; but such formula has a tendency to impair the ductility of the metal.

Common Brass. Suitable for bending, stamping and plate work which does not require drilling or cutting.

Clock or Drill Brass. This mixture contains lead, which gives it the short grain necessary for cutting and drilling. The lead, however, makes the metal more liable to break or crack in bending.

Drawing Brass. A very ductile metal prepared especially for shell work of all kinds.

Spinning Brass. A super-quality of brass which will stand the severe test of spinning without opening or destroying the grain of the metal.

Brazing Brass. A mixture which is fusible at a sufficiently high heat to stand hard-solder brazing. It also has excellent drawing qualities except when especially alloyed for free cutting mixtures.

High Brass. A term sometimes used to distinguish any of the foregoing alloys from the low brass and bronze mixtures; but on account of its diversified meaning we do not recommend its use any more than is absolutely necessary.

Low Brass. A special alloy possessing a color half way between common brass and bronze.

Bronze. Made rich in copper for coloring effects. Also alloyed with tin to give it wearing qualities which are especially suitable for bearings and durable spring action.

Copper. A metal rolled from the product of pure copper ore. It possesses high conductivity, which makes it especially economical as a carrier of electricity. It has also a high power to resist corrosion.

Nickel Silver. An alloy which approaches the color of silver in proportion to the amount of nickel used. Especially valuable in electrical work on account of its high resistance qualities.

White Metal. A composition belonging to the Nickel Silver classification, and distinguished for its permanent white color, which is non-tarnishable. It can be drawn or spun very readily, and is especially suitable for exposed surfaces which require constant polishing.

Tempers of Metals

Quarter Hard. Hard enough to have some resistance, but soft enough to double seam without cracking.

Half Hard. A temper suitable for punching, blanking, and simple forming. Will double seam on the lighter gauges.

Regular Hard. Too stiff to be worked beyond a right angled bend. Used mostly for flat and straight work.

Spring. Hard enough to resume position after a definite deflection.

Extra Spring. As hard as brass can be rolled. Used for extraordinarily stiff spring work.

Bending Temper. A special temper used in the manufacture of tubing; just soft enough to take ordinary bends without losing its shape or denting badly, and sufficiently close grained to take a high polish.

Cold Rolled. A temper used exclusively in connection with copper. It practically corresponds with Light Anneal in brass.

Note.—These tempers apply equally well to sheet copper; Regular Hard being the temper usually selected for bus bar work; Extra Spring for brush copper, and Soft, or Cold Rolled temper for boiler, roof, or tank work.

The terms "High" and "Low" refer to the quality of the Brass and not the temper.

Average Shrinkage of Castings, Per Foot

The allowance necessary for shrinkage varies for different kinds of metal, and the different conditions under which they are cast. For castings where the thickness runs fairly uniform, cast under ordinary conditions, the following allowance can be made:

Cast Iron	1/8"	Aluminum	3/16"
Brass	1/16"	Brittania	1/32"
Steel	1/4"	Lead	5/16"
Mal. Iron	1/8"	Copper	3/16"
Zinc	5/16"	Bismuth	5/32"
Tin	1/12"		

Approximate Melting Points of Metals and Various Substances

Solid	Degrees Centigrade	Degrees Fahrenheit
Alloy—3 Lead, 2 Tin, 5 Bismuth	100	212
Alloy—1 Lead, 1½ Tin	200	392
Alloy—1 Lead, 1 Tin	215	419
Aluminum	657.3	1215
Antimony	430 to 630	806 to 1166
Bismuth	269.2	517
Brass	1030	1886
Bronze	920	1688
Cadmium	320	608
Chromium	1487 to 1515	2709 to 2749
Cobalt	1463 to 1500	2665 to 2732
Copper	1054 to 1084	1929 to 1983
Gold	1045 to 1064	1913 to 1947
Iridium	1950 to 2500	3542 to 4532
Iron—Cast Gray	1220 to 1530	2228 to 2786
Iron—Cast White	1050 to 1135	1922 to 2075
Iron—Wrought	1500 to 1600	2732 to 2912
Lead	327	620
Magnesium	750	1382
Manganese	1207 to 1245	2205 to 2273
Mercury	—39.7	—39.5
Nickel	1435	2615
Osmium	2500	4532
Palladium	1546 to 1900	2815 to 3452
Platinum	1753 to 1780	3187 to 3276
Potassium	62	144
Rhodium	2000	3632
Ruthenium	2000+	3632
Silver	960	1760
Sodium	79 to 95	174.2 to 203
Steel	1300 to 1378	2372 to 2532
Steel—Hard	1410	2570
Steel—Mild	1475	2687
Tin	232	449
Titanium	3000	5432
Tungsten	1700	3092
Vanadium	1775	3227
Zinc	419	786
Phosphorus	44.4	112
Calcium	760	1400

Melting Points of Welding Rods

Material	Approximate Melting Point Degrees C.	F.	Approximate Tensile Strength Lbs. Per Sq. In. Annealed Rods
Tobin Bronze	885	1625	54,000
Manganese Bronze	870	1598	60,000
Phosphor Bronze	1050	1922	45,000
Brazing Metal	890	1634	50,000
Deoxidized Copper	1083	1981	31,000
Commercial Electrolytic Copper	1083	1981	30,000
Duronze	1040	1904	50,000

Anneals of Metals

Light Anneal. Temper barely drawn. Suitable for cut and draw work where close grain is essential. Also often used in place of Cold Rolled temper.

Medium Anneal. Ductile enough for deep drawing or fine spinning. Compares to about half anneal.

Regular Soft Anneal. This is the regular spinning temper. Suitable also for stamping, embossing and complicated forming.

Dead Soft Anneal. As soft as brass can be fired without fusing. Good for difficult forming or die-sinkers' work, and heavy embossing.

Pickling Solutions, Etc.

CAUTION

The following chemicals for pickling are dangerous and very corrosive and if one is not familiar with them and their action they should not be used. These mixtures are to rapidly remove scale and the tarnished surface of the metal so as to develop the natural fine color of the metal itself.

Sulphuric Acid Pickle:

Add ½ gallon vitriol (75% H_2SO_4, sp.gr. 1.7) to 100 gallons of water.

Sulphuric-Chrome Acid Pickle:

7 lbs. potassium or sodium bichromate should be dissolved in 10 gallons of water; then add 1 gallon (17 lbs.) vitriol (75% H_2SO_4, sp.gr. 1.7).

Nitric Acid Bright Dip:

200 parts by weight of 52% nitric acid (sp.gr. 1.33). 1 to 2 parts of common salt.

Nitric-Sulphuric Acid Bright Dip:

100 parts by weight of strong sulphuric acid (sp.gr. 1.84).
75 parts by weight of strong nitric acid (sp.gr. 1.38).
Add the sulphuric to the nitric acid in small quantities at a time, stirring continually.
Allow to cool before using. A little common salt added to the bath before using will prove advantageous.

For bright dipping the article should be almost dry. Dip in the acid mixture for only a moment and then wash quickly in plenty of clean water. A matt finish results if the dipping is too slow or if the bath is warm. A matt finish may be bright finished by re-dipping in a mixture of:

6 parts of hydrochloric acid,
1 part of nitric acid,
2 parts water.

To prevent tarnishing of bright dipped articles, give them a final dip after thoroughly washing in water in a weak solution of argol or tartaric acid.

Etching Solution—Three parts nitric acid to one part muriatic acid. Cover the piece to be etched with beeswax. This can be done by heating the piece in a gas or alcohol flame and rubbing the wax over the surface. Use a sharp steel point or hard lead pencil point as a marker. A pointed glass dropper can be used to put the solution at the place needed. After the solution foams for two or three minutes, remove with blotting paper and put oil on the piece and then heat and remove the wax.

To Clean Copper—Prepare a strong soda or potash lye solution by adding about a pound of lye to a pail of boiling water. Dip the metal or apply this solution with a brush, scrubbing well. Then rinse or wash with plain hot water and finally with cold water.

Cleaning Brass—Make a mixture of one part common nitric acid and one-half part sulphuric acid in a stone jar, having also ready a pail of fresh water and a box of sawdust. The articles to be treated are dipped into the acid, then thrown into the water and finally rubbed with sawdust. This immediately changes them into a brilliant color. If the brass has become greasy it is first dipped into a strong solution of potash and soda in warm water; this cuts grease so acid has full power to act.

Cleaning Brass. 1 Roche alum and 16 water. Mix. The articles to be cleaned must be made warm, then rubbed with the above mixture, and finished with fine tripoli.

To Polish Brass. Brass polishing paste: Three parts of oxalic acid are dissolved in 40 parts of hot water, to which is added 100 parts of powdered pumice stone, 2 parts of oil of turpentine, 12 parts of soft soap and 12 parts of fat oil.

Protecting Brass from Tarnish. To keep brass from tarnishing: After thoroughly cleaning and removing the last traces of grease, by the use of potash and water, the cage or other brass work must be carefully rinsed with water and dried, but in doing it, care must be taken not to handle any portion with the bare hand, nor anything else that is greasy. The preservative varnish may be shellac, much diluted with alcohol, or it may be hard oil finish. In either case, the brass should be made pretty warm, and the varnish or shellac put on with a brush in as thin a coat as possible. The proportion of shellac to alcohol is about 2 oz. of the former to 9 oz. of the latter. Sometimes gamboge is used for a coloring matter, to make the varnish more yellow, and sometimes dragon's blood.

To Color Brass a Steel Blue—Dissolve 3 drams antimony sulphite and 4 ounces calcined soda in 1½ pints water. To this add 5½ drams kermes. Filter and mix this solution with 5½ drams tartar, 11 drams sodium hyposulphite, and 1½ pints water. Polished sheet brass placed in the warm mixture will assume a steel blue color.

To Give Brass a Dull Appearance—Mix 1 part (by weight) of iron rust, 1 part white arsenic, and 12 parts hydrochloric acid. Clean the brass thoroughly and apply with a brush until the desired color is obtained, after which it should be oiled, dried, and lacquered.

To Clean Zinc—Rub with a piece of cotton cloth dipped in kerosene, afterwards with a dry cloth.

Metal-Marking Solution. To give iron or steel a bright copper surface which will show distinctly the lines drawn by scriber, dividers, surface gage, etc., apply a marking solution composed of one ounce of copper sulphate, four ounces of water, and about one teaspoonful of nitric acid. (One ounce is equivalent to about eight teaspoonfuls.) Heating small pieces of steel to a blue will give a similar surface.

Removing Rust from Steel. Steel which has been rusted can be cleaned by brushing with a paste compound of ½ ounce cyanide potassium, ½ ounce castile soap, 1 ounce whiting, and water sufficient to form a paste. The steel should be washed with a solution of ½ ounce cyanide potassium in 2 ounces water.

To Polish Iron. You cannot keep the bright color of polished iron on the hot parts of an engine, without constant attention and wiping with engine oil. Oxalic acid may help the cleaning, but the acid left on the bright surface favors oxidation. For cleaning, use tripoli, rottenstone, or pulverized pumice stone, with engine or kerosene oil. Neglected or dirty spots may be removed with a scraper and fine emery paper and afterwards rubbed with oil. Every part of bright work around an engine should be wiped with oil. Moisture immediately discolors a clean bright surface. Polish the lubricator with rottenstone and oil and only when necessary. Too much polishing soon makes it look old from wear.

Verde Antique Finish—Copper or Brass. The following is a method to color and produce a patina or verde antique effect. The green bronze antique tones are the result of a combination of chemicals, pigments, and artistic skill. The finish is quickly obtained and may be used on brass or copper. It can be stippled on to a plain surface, or dipped on background work where the high parts are to be relieved, and is adapted to large surfaces. The green will work out over the metal.

The solution is as follows: Nitrate of copper, 4 ounces; sal ammoniac, 4 ounces; calcium chloride, 4 ounces; water, 1 gallon. The green will appear in a short time and should be lacquered.

CHEMICAL COMPOSITIONS OF S. A. E. STEELS

Taken from S.A.E. Handbook, 1936 Edition

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CARBON STEELS

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Range	Sulfur Range
1010	0.05-0.15	0.30-0.60	0.045 Max.	0.055 Max.
1015	0.10-0.20	0.30-0.60	0.045 Max.	0.055 Max.
X1015	0.10-0.20	0.70-1.00	0.045 Max.	0.055 Max.
1020	0.15-0.25	0.30-0.60	0.045 Max.	0.055 Max.
X1020	0.15-0.25	0.70-1.00	0.045 Max.	0.055 Max.
1025	0.20-0.30	0.30-0.60	0.045 Max.	0.055 Max.
X1025	0.20-0.30	0.70-1.00	0.045 Max.	0.055 Max.
1030	0.25-0.35	0.60-0.90	0.045 Max.	0.055 Max.
1035	0.30-0.40	0.60-0.90	0.045 Max.	0.055 Max.
1040	0.35-0.45	0.60-0.90	0.045 Max.	0 055 Max.
X1040	0.35-0.45	0.40-0.70	0.045 Max.	0.055 Max.
1045	0.40-0.50	0.60-0.90	0.045 Max.	0.055 Max.
X1045	0.40-0.50	0.40-0.70	0.045 Max.	0.055 Max.
1050	0.45-0.55	0.60-0.90	0.045 Max.	0.055 Max.
X1050	0.45-0.55	0.40-0.70	0.045 Max.	0.055 Max.
1055	0.50-0.60	0.60-0 90	0 040 Max.	0.055 Max.
X1055	0.50-0.60	0.90-1.20	0.040 Max.	0.055 Max.
1060	0.55-0.70	0.60-0.90	0 040 Max.	0.055 Max.
1065	0.60-0.75	0.60-0.90	0.040 Max.	0.055 Max.
X1065	0.60-0.75	0.90-1.20	0.040 Max.	0.055 Max.
1070	0.65-0.80	0.60-0.90	0.040 Max.	0.055 Max.
1075	0.70-0.85	0.60-0.90	0.040 Max.	0 055 Max.
1080	0.75-0.90	0.60-0.90	0.040 Max.	0.055 Max.
1085	0.80-0.95	0.60-0.90	0.040 Max.	0.055 Max.
1090	0.85-1.00	0.60-0.90	0.040 Max.	0 055 Max.
1095	0.90-1.05	0.25-0.50	0.040 Max.	0.055 Max.

FREE CUTTING STEELS

1112	0.08-0.16	0.60-0.90	0.09-0.13	0.10 - 0.20
X1112	0.08-0.16	0.60-0.90	0.09-0.13	0.20 - 0.30
1115	0.10-0.20	0.70-1.00	0 045 Max.	0.075- 0.15
1120	0.15-0.25	0.60-0.90	0.045 Max.	0.075- 0.15
X1314	0.10-0.20	1.00-1.30	0.045 Max.	0.075- 0.15
X1315	0.10-0.20	1.30-1.60	0 045 Max.	0 075- 0.15
X1330	0.25-0.35	1.35-1.65	0.045 Max.	0.075- 0.15
X1335	0.30-0.40	1.35-1.65	0.045 Max.	0.075- 0.15
X1340	0.35-0.45	1.35-1.65	0.045 Max.	0.075- 0.15

MANGANESE STEELS (1)

T1330	0.25-0.35	1.60-1.90	0.040 Max.	0.050 Max.
T1335	0.30-0.40	1.60-1.90	0.040 Max.	0.050 Max.
T1340	0.35-0.45	1.60-1.90	0.040 Max.	0.050 Max.
T1345	0.40-0.50	1.60-1.90	0.040 Max.	0.050 Max.
T1350	0.45-0.55	1.60-1.90	0.040 Max.	0.050 Max.

NICKEL STEELS (1)

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Maximum	Sulfur Maximum	Nickel Range
2015	0.10-0.20	0.30-0.60	0.040	0.050	0.40-0.60
2115	0.10-0.20	0.30-0.60	0.040	0.050	1.25-1.75
2315	0.10-0.20	0.30-0.60	0.040	0.050	3.25-3.75
2320	0.15-0.25	0.30-0.60	0.040	0.050	3.25-3.75
2330	0.25-0.35	0.50-0.80	0.040	0.050	3.25-3.75
2335	0.30-0.40	0.50-0.80	0.040	0.050	3.25-3.75
2340	0.35-0.45	0.60-0.90	0.040	0.050	3.25-3.75
2345	0.40-0.50	0.60-0.90	0.040	0.050	3.25-3.75
2350	0.45-0.55	0.60-0.90	0.040	0.050	3.25-3.75
2515	0.10-0.20	0.30-0.60	0.040	0.050	4.75-5.25

NICKEL CHROMIUM STEELS (1)

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Maximum	Sulfur Maximum	Nickel Range	Chromium Range
3115	0.10-0.20	0.30-0.60	0.040	0.050	1.00-1.50	0.45-0.75
3120	0.15-0.25	0.30-0.60	0.040	0.050	1.00-1.50	0.45-0.75
3125	0.20-0.30	0.50-0.80	0.040	0.050	1.00-1.50	0.45-0.75
3130	0.25-0.35	0.50-0.80	0.040	0.050	1.00-1.50	0.45-0.75
3135	0.30-0.40	0.50-0.80	0.040	0.050	1.00-1.50	0.45-0.75
3140	0.35-0.45	0.60-0.90	0.040	0.050	1.00-1.50	0.45-0.75
X3140	0.35-0.45	0.60-0.90	0.040	0.050	1.00-1.50	0.60-0.90
3145	0.40-0.50	0.60-0.90	0.040	0.050	1.00-1.50	0.45-0.75
3150	0.45-0.55	0.60-0.90	0.040	0.050	1.00-1.50	0.45-0.75

NICKEL CHROMIUM STEELS (1) (Continued)

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Maximum	Sulfur Maximum	Nickel Range	Chromium Range
3215	0.10-0.20	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3220	0.15-0.25	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3230	0.25-0.35	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3240	0.35-0.45	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3245	0.40-0.50	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3250	0.45-0.55	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3312	Max.-0.17	0.30-0.60	0.040	0.050	3.25-3.75	1.25-1.75
3325	0.20-0.30	0.30-0.60	0.040	0.050	3.25-3.75	1.25-1.75
3335	0.30-0.40	0.30-0.60	0.040	0.050	3.25-3.75	1.25-1.75
3340	0.35-0.45	0.30-0.60	0.040	0.050	3.25-3.75	1.25-1.75
3415	0.10-0.20	0.30-0.60	0.040	0.050	2.75-3.25	0.60-.095
3435	0.30-0.40	0.30-0.60	0.040	0.050	2.75-3.25	0.60-.095
3450	0.45-0.55	0.30-0.60	0.040	0.050	2.75-3.25	0.60-.095

MOLYBDENUM STEELS (1)

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Maximum	Sulfur Maximum	Chromium Range	Nickel Range	Molybdenum Range
4130	0.25-0.35	0.50-0.80	0.040	0.050	0.50-0.80	.....	0.15-0.25
X4130	0.25-0.35	0.40-0.60	0.040	0.050	0.80-1.10	.....	0.15-0.25
4135	0.30-0.40	0.60-0.90	0.040	0.050	0.80-1.10	.....	0.15-0.25
4140	0.35-0.45	0.60-0.90	0.040	0.050	0.80-1.10	.....	0.15-0.25
4150	0.45-0.55	0.60-0.90	0.040	0.050	0.80-1.10	.....	0.15-0.25
4340	0.35-0.45	0.50-0.80	0.040	0.050	0.50-0.80	1.50-2.00	0.30-0.40
4345	0.40-0.50	0.50-0.80	0.040	0.050	0.60-0.90	1.50-2.00	0.15-0.25
4615	0.10-0.20	0.40-0.70	0.040	0.050	.....	1.65-2.00	0.20-0.30
4620	0.15-0.25	0.40-0.70	0.040	0.050	.....	1.65-2.00	0.20-0.30
4640	0.35-0.45	0.50-0.80	0.040	0.050	.....	1.65-2.00	0.20-0.30
4815	0.10-0.20	0.40-0.60	0.040	0.050	.....	3.25-3.75	0.20-0.30
4820	0.15-0.25	0.40-0.60	0.040	0.050	.....	3.25-3.75	0.20-0.30

CHROMIUM STEELS (1)

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Maximum	Sulfur Maximum	Chromium Range
5120	0.15-0.25	0.30-0.60	0.040	0.050	0.60-0.90
5140	0.35-0.45	0.60-0.90	0.040	0.050	0.80-1.10
5150	0.45-0.55	0.60-0.90	0.040	0.050	0.80-1.10
52100	0.95-1.10	0.20-0.50	0.030	0.035	1.20-1.50

CHROMIUM VANADIUM STEELS (1)

						Vanadium Min.	Vanadium Desired
6115	0.10-0.20	0.30-0.60	0.040	0.050	0.80-1.10	0.15	0.18
6120	0.15-0.25	0.30-0.60	0.040	0.050	0.80-1.10	0.15	0.18
6125	0.20-0.30	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18
6130	0.25-0.35	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18
6135	0.30-0.40	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18
6140	0.35-0.45	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18
6145	0.40-0.50	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18
6150	0.45-0.55	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18
6195	0.90-1.05	0.20-0.45	0.030	0.035	0.80-1.10	0.15	0.18

TUNGSTEN STEELS (1)

S.A.E. No.	Carbon Range	Manganese Maximum	Phosphorus Maximum	Sulfur Maximum	Chromium Range	Tungsten Range
71360	0.50-0.70	0.30	0 035	0.040	3.00-4.00	12.00-15.00
71660	0.50-0.70	0.30	0.035	0.040	3.00-4.00	15.00-18.00
7260	0.50-0.70	0.30	0.035	0.040	0.50-1.00	1.50- 2.00

SILICON MANGANESE STEELS

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Maximum	Sulfur Maximum	Silicon Range
9255	0.50-0.60	0.60-0.90	0.040	0.050	1.80-2.20
9260	0.55-0.65	0.60-0.90	0.040	0.050	1.80-2.20

CORROSION AND HEAT RESISTING ALLOYS

S.A.E. No.	Carbon Maximum	Manganese Range	Silicon Maximum	Phosphorus Maximum	Sulfur Maximum	Chromium Range	Nickel Range
30905	0.08	0.20-0.70	0.75	0.030	0.030	17.00-20.00	8.00-10.00
30915	0.09-0.20	0.20-0.70	0.75	0.030	0.030	17.00-20.00	8.00-10.00
51210	0.12	0.60	0.50	0.030	0.030	11.50-13.00	.....
X51410	0.12	0.60	0.50	0.030	0.15-0.50	13.00-15.00	.....
51335	0.25-0.40	0.60	0.50	0.030	0.030	12.00-14.00	.....
51510	0.12	0.60	0.50	0.030	0.030	14.00-16.00	.....
51710	0.12	0.60	0.50	0.030	0.030	16.00-18.00	.....

(1) Silicon range of all S.A.E. basic open hearth steels shall be 0.15-0.30. For electric and acid open hearth alloy steels, the silicon content shall be 0.15 minimum.

It is recommended that users of these specifications check back to the Society of Automotive Engineers, Inc., 29 West 39th St., New York City, for information as to any modifications that may have been subsequently adopted in these specifications.

Heat Temperatures and Colors for Hardening Steel

Centigrade	Fahrenheit	Color
400	753	RED—Visible in the Dark.
474	885	RED—Visible at Twilight.
525	975	RED—Visible at Daylight.
581	1077	RED—Visible at Sunlight.
800	1472	DULL CHERRY RED.
900	1652	CHERRY RED.
1000	1832	BRIGHT CHERRY RED.
1100	2012	OANGE RED.
1200	2192	ORANGE YELLOW.
1300	2372	YELLOW WHITE.
1400	2552	WHITE: WELDING
1500	2732	BRILLIANT WHITE
1600	2912	BLUISH WHITE.

To Harden Cast Iron. Many times it is very convenient to make an article of cast iron that needs to be finished, and which should be very hard. Cast iron can be hardened as easily as steel, and to such a degree of hardness that a file will not touch it. Take ½ pint sulphuric acid, 1 peck common salt, ½ pound saltpetre, 2 pounds alum, ¼ pound prussiate potash, ¼ pound cyanide potash; dissolve in 10 gallons soft water. Be sure that all the ingredients are dissolved. Heat the iron to a cherry red, and dip it in the solution. If the article needs to be very hard, heat and dip the second, and even the third time.

Hardening Cast Iron. Heat to cherry red, coat with cyanide of potassium, reheat to a cherry red, and plunge into cold water.

Case Hardening. Place horn, hoof, bone dust or shreds of leather, together with the article to be case hardened, in an iron box subject to a blood red heat, then immerse the article in cold water.

Case Hardening Mixtures: 3 Prussiate of potash, 1 Sal-ammoniac, or: 1 Prussiate of potash, 2 Sal-ammoniac, 2 Bone dust.

Case Hardening Iron. Common Prussiate of Potash Process: Crush the potash to a powder, being careful that there are no lumps left in it, then heat the iron as hot as possible, without causing it to scale; with a piece of rod iron, spoon shaped at the end, apply the prussiate of potash to the surface of the iron, rub it with the spoon end of the rod until it fuses and runs all over the article, which must then be placed in the fire again and slightly reheated and then plunged into water, observing the rules given for immersing steel so as not to warp the article.

Case hardening, to be quickly performed, is done by the use of prussiate of potash. This is powdered and spread upon the surface of the piece of iron to be hardened, after the iron is heated to a bright red. It almost instantly fluxes or flows over the surface and when the iron is cooled to a dull red it is plunged into cold water. Some prefer a mixture of prussiate of potash 3 parts, sal ammoniac 1 part; or prussiate 1 part, sal ammoniac 2 parts and finely powdered bone dust (unburned) 2 parts. The application is the same in each case. Proper case hardening, with a deep coating of steel if desired, is done by packing the article to be hardened in an iron box with horn, hoof, bone dust, shreds of leather or raw hide, or either of these and heated to a red heat, from one to three hours, then plunged in water.

To Temper Steel Very Hard. Water 4 parts; flour 1 part; salt 2 parts; mixed to a paste. Heat the steel until a coating adheres when dipped into the mixture; then heat to a cherry red and cool in cold, soft water. The steel will come out white and very hard.

To Soften Steel. Place a quantity of newly-burnt lime in a damp place, where it will fall in the form of flour; put it in an iron box. Heat the articles to dull red; clean off all scale and put in lime and completely cover with lime; cover box over with iron lid and leave until cold. The more lime and the larger the box, the better. Keep airtight if possible.

Annealing Steel. (Small quantity.) Heat the steel to a cherry red in a charcoal fire, then bury it in sawdust, in an iron box, covering the sawdust with ashes. Let it stay until cold.

For a larger quantity and when it is required to be very soft, pack the steel with cast iron (lathe or planer) chips, in an iron box, as follows: Having at least half or three-quarters of an inch in depth of chips in the bottom of the box, put in a layer of steel, then more chips to fill spaces between the steel and also the half or three-quarters of an inch space between the sides of the box and steel, then more steel; and lastly, at least one inch in depth of chips, well rammed down on top of the steel. Heat the whole to and keep at a red heat for from two to four hours. Do not disturb the box until cold.

Annealing Steel. For small pieces of steel, take a piece of gas-pipe two or three inches in diameter, and put the pieces in it, first heating one end of the pipe and drawing it together, leaving the other end open to look into. When the pieces are of a cherry red, cover the fire with sawdust. Use a charcoal fire, and leave the steel in over night.

To Anneal Cast Iron. Heat to a cherry-red, having it lie level in the fire. Then with tongs, put on a piece of sulphur, a little less in size than the hole is to be. This softens the iron entirely through. Let it lie in the fire until cooled, when it is ready to drill.

How to Anneal Small Tools. Prepare two pieces of wood with one surface of each perfectly smooth. Heat the articles to be annealed to a cherry red and place them between the two smoothed surfaces of the wood pieces and clamp the whole in a vise. The hot metal will burn a pocket with charcoal surrounding it. When thoroughly cool the tool may be removed.

How to Anneal Brass or Copper. In working brass or copper, it will become hard, and if hammered to any great extent will split. To prevent cracking or splitting, the piece must be heated to a dull red heat and plunged into cold water; this will soften it so it can be worked easily. Be careful not to heat brass too hot, or it will fall to pieces. The piece must be annealed frequently during the process of hammering.

To Case Harden Soft Steel. Place the steel to be hardened in the furnace and heat to a cherry red. Then apply cyanide of potassium to cover the entire surface, and see that it fuses. Return to the fire and heat again and then plunge in cold water. Contributed by H. M. Dinsmore, Providence, R. I.

Temper can be drawn from brass by the same process by which it is put into iron—by heating to cherry red and then plunging into water.

Alloying Elements in Steel

Metallic Molybdenum. Pure molybdenum is a white, soft, ductile metal resembling platinum. In the production of molybdenum metal, ammonium molybdate is heated in an electric furnace and reduced by hydrogen to pure molybdenum powder, which is pressed and solidified by passing a strong electric current through it. The resulting ingot is rolled and drawn into the required sizes of sheet and wire. Its use is practically limited to the brackets in incandescent lamps and parts of radio tubes.

Effect of Molybdenum in Steel. Molybdenum, according to Sauveur, is soluble in both gamma and alpha iron. It is generally accepted that it also forms complex carbides in steel, and induces in the steel a marked ability to retain these carbides in solid solution upon cooling from above the critical temperature. In this propensity toward hardening, Gillett and Mack state that molybdenum is, with the exception of carbon, the most active and potent element used in steel. Strength, resistance to wear, and toughness are the resulting qualities imparted to the steel.

Vanadium in Steel. The metallic element vanadium is classified in the fifth group of elements in the Periodic System. It is grayish-white in appearance, non-magnetic and has a high electrical resistivity. It is considered the hardest of the metallic elements and the most difficult to reduce from its oxides. It has never been produced in the pure metallic state. The discovery of vanadium is credited to the Swedish chemist, Sefstrom, who detected it in some remarkably soft, ductile iron produced from an ore at Taberg, Sweden.

Vanadium Tool Steel. Vanadium is a constituent of practically all high-speed tool steels, in amounts varying from 0.30 to 2.50 per cent. It is also used extensively in straight carbon tool steel for all tool steel applications. Vanadium tool steels have a greater hardening range, can be heated to a higher temperature without injury, have greater depth of penetration of hardening effect, are stronger, tougher, and hold their cutting edge better. The percentage of vanadium in tool steels will range from 0.15 to 0.35 per cent.

Weights of Steel Bars

Carbon Steels. The weights given have been calculated from the unit, 1 cubic inch equals 0.2833 pound or its equivalent, 1 cubic foot equals 489.54 pounds. A convenient unit much used in practice is 1 cubic inch equals 0.3 pound. This gives weights about 6 per cent heavier than those in the tables, but since bar steel is usually furnished slightly full to size, weights calculated on this basis yield fairly close working results for all except very large sizes.

High Speed Steels. On account of the large proportion of special elements present, high speed steels are heavier than carbon steels. While this increased weight is not constant, a fairly close estimation of the weight of high speed steels may be obtained by adding 10 per cent to the figures for carbon steel as given in the tables. In other words, multiply the figures in the tables by 1.1 to obtain the weight of high speed steel.

Steel Tests

The elastic limit is the maximum load which can be applied to a piece of steel without causing permanent deformation. For example, if a rod of steel is firmly attached to its upper end and a load of 1000 lbs. is put on the lower end, the rod will stretch slightly. If the load is removed, the rod will go back to its original length. If a load of 2000 lbs. is applied, the rod will stretch twice as much and will again return to its original dimensions. If the loading is gradually increased, a point will eventually be reached when the amount of stretch will be more than proportionally increased. If the load is then removed, it will be found that the rod has been permanently deformed and that it will not return to its original length. This is the elastic limit of the steel. The elastic limit is usually about one-half of the tensile strength of the annealed carbon steels.

Tensile strength is the load (usually expressed in pounds per square inch) required to rupture a piece of steel. The tensile strength of Toncan metal is about 50,000 lbs. per square inch.

Elongation is the amount of stretch in the metal up to the point of fracture. Elongation is usually expressed in per cent in eight inches or in two inches. For example, if an eight inch bar is measured after it is fractured and found to be ten inches long, the increase in length (2 inches) or elongation will be 25% of the original length. The elongation of Toncan metal is about 25% in eight inches.

Reduction of area means the amount of reduction in the cross section of the test piece at the point of fracture. For example, if the cross section of the test was originally one square inch and the cross section at the point of fracture is found to be one-half of a square inch, the reduction of area would be 50%. The reduction of area of Toncan metal is about 60%. The reduction of area and the elongation are used as measures of the ductility of the metal.

To Test the Quality of Iron. If fracture gives long, silky fibres of leaden gray hue, fibres cohering and twisting together before breaking, it may be considered a tough, soft iron. A medium even grain mixed with fibres, a good sign; a short, blackish fibre indicating badly refined iron. A very fine grain denotes a hard, steady iron apt to be cold short, hard to work with a file. Coarse grain with a brilliant crystallized fracture, yellow or brown spots denotes a brittle iron, cold short working easy when heated, welds easily. Cracks on the edge of bars, sign of hot short iron. Good iron is readily heated, soft under the hammer, and throws out but few sparks. All iron contains more or less carbon, the hardest the most.

Comparison of Brinnell, Rockwell and Scleroscope Hardness Numerals

†Brinnell Hardness Tests made with loads of 3000 and 500 Kg. for 30 seconds.

Rockwell Hardness Tests taken on Models 3A and 3F under conditions as given by manufacturer.

Scleroscope Hardness Tests taken on Types C and D.

The hardness values were obtained on specimens over one inch in cross section and on various grades of carbon and alloy steels.

The conversions, of course, can only be approximate for all grades and gages of steel, so the table is intended for a guide for the comparison of hardness numerals.

Dia. of Impression mm.	BRINNELL Load Applied and B. H. Numbers 3000 Kg.	500 Kg.	ROCKWELL "C" Diamond Cone	"B" 1/16 Inch Ball	"B" 1/8 Inch Penetrator	SCLEROSCOPE
2.00	945	158	.....	.....	.....	.....
2.05	899	150	.....	.....	.....	.....
2.10	856	143	.....	.....	.....	.....
2.15	817	136	.....	.....	.....	.....
2.20	780	130	64	.....	.....	98
2.25	745	124	63	.....	.....	98
2.30	712	119	61	.....	.....	97
2.35	682	114	60	.....	.....	96
2.40	653	109	59	.....	.....	95
2.45	627	104	57	.....	.....	93
2.50	601	100	56	.....	.....	92
2.55	578	96.3	55	.....	.....	90
2.60	555	92.6	53	.....	.....	88
2.65	534	89.0	52	.....	.....	86
2.70	514	85.7	51	.....	.....	84
2.75	495	82.6	50	.....	.....	81
2.80	477	79.6	49	.....	.....	79
2.85	461	76.8	48	.....	.....	76
2.90	444	74.1	47	.....	.....	74
2.95	429	71.5	45	.....	.....	72
3.00	415	69.1	43	.....	.....	69
3.05	401	66.8	42	.....	.....	67
3.10	388	64.6	41	.....	.....	64
3.15	375	62.5	40	.....	.....	62
3.20	363	60.5	39	.....	.....	60
3.25	352	58.6	38	.....	.....	58
3.30	341	56.8	36	.....	.....	56
3.35	331	55.1	35	.....	.....	54
3.40	321	53.4	33	.....	.....	52
3.45	311	51.8	32	.....	.....	50
3.50	302	50.3	31	.....	.....	48
3.55	293	48.9	30	.....	.....	47
3.60	285	47.5	29	.....	.....	45
3.65	277	46.1	28	.....	.....	43
3.70	269	44.9	27	.....	.....	41
3.75	262	43.6	25	.....	.....	40
3.80	255	42.4	24	.....	.....	38
3.85	248	41.3	23	.....	.....	37
3.90	241	40.2	22	102	.....	36
3.95	235	39.1	21	101	.....	35
4.00	229	38.1	19	100	.....	34
4.05	223	37.1	18	99	.....	33
4.10	217	36.2	17	98	110	32
4.15	212	35.3	15	97	110	31
4.20	207	34.4	13	95	110	30
4.25	201	33.6	12	94	109	29
4.30	197	32.8	11	93	109	29
4.35	192	32.0	10	92	108	28
4.40	187	31.2	9	91	108	28
4.45	183	30.5	8	90	108	27
4.50	179	29.8	7	90	107	26
4.55	174	29.1	6	89	107	26
4.60	170	28.4	4	88	106	25
4.65	167	27.8	3	87	106	25
4.70	163	27.1	2	86	105	24
4.75	159	26.5	1	85	105	24
4.80	156	25.9	0	84	104	23
4.85	152	25.4	0	83	104	23
4.90	149	24.8	—1	82	103	22
4.95	146	24.3	—2	81	103	22
5.00	143	23.8	—3	80	102	21
5.05	140	23.3	—4	79	102	21
5.10	137	22.8	—6	78	101	20
5.15	134	22.3	—7	77	101	20
5.20	131	21.8	— 9	76	100	19
5.25	128	21.4	—11	75	100	19
5.30	126	20.9	—12	74	99	19
5.35	123	20.5	—14	73	99	19
5.40	121	20.1	—16	72	98	19
5.45	118	19.7	—17	71	98	19
5.50	116	19.3	—19	70	97	19
5.55	114	18.9	—20	68	97	18
5.60	111	18.6	.....	67	96	18
5.65	109	18.2	.....	66	95	18
5.70	107	17.8	.....	65	95	18
5.75	105	17.5	.....	64	94	18
5.80	103	17.2	.....	63	93	18
5.85	101	16.8	.....	62	93	17
5.90	99.2	16.6	.....	61	92	....
5.95	97.3	16.2	.....	60	91	....
6.00	95.5	15.9	.....	59	91	....
6.05	93.7	15.6	.....	58	90	....
6.10	92.0	15.3	.....	57	89	....
6.15	90.3	15.1	.....	55	89	....
6.20	88.7	14.8	.....	54	88	....
6.25	87.1	14.5	.....	52	87	....
6.30	85.5	14.2	.....	50	87	....
6.35	84.0	14.0	.....	49	86	....
6.40	82.5	13.7	.....	47	85	....
6.45	81.0	13.5	.....	45	85	....
6.50	79.6	13.3	.....	43	84	....
6.55	78.2	13.0	.....	42	84	....

Comparison of Thermometric Scales

Centigrade and Fahrenheit

C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.	C.	F.
–40	–40	– 4	24.8	17	62.6	37	98.6	58	136.4	78	172.4	99	210.2	195	383.0	300	572	600	1112
–35	–31	– 3	26.6	18	64.4	38	100.4	59	138.2	79	174.2	100	212.0	200	392.0	310	590	650	1202
–30	–22	– 2	28.4	19	66.2	39	102.2	60	140.0	80	176.0	105	221.0	205	401.0	320	608	700	1292
–25	–13	– 1	30.2	20	68.0	40	104.0	61	141.8	81	177.8	110	230.0	210	410.0	330	626	750	1382
–20	– 4.0	0	32.0	21	69.8	41	105.8	62	143.6	82	179.6	115	239.0	215	419.0	340	644	800	1472
–19	– 2.2	1	33.8	22	71.6	42	107.6	63	145.4	83	181.4	120	248.0	220	428.0	350	662	850	1562
–18	– 0.4	2	35.6	23	73.4	43	109.4	64	147.2	84	183.2	125	257.0	225	437.0	360	680	900	1652
–17	1.4	3	37.4	24	75.2	44	111.2	65	149.0	85	185.0	130	266.0	230	446.0	370	698	950	1742
–16	3.2	4	39.2	25	77.0	45	113.0	66	150.8	86	186.8	135	275.0	235	455.0	380	716	1000	1832
–15	5.0	5	41.0	26	78.8	46	114.8	67	152.6	87	188.6	140	284.0	240	464.0	390	734	1050	1922
–14	6.8	6	42.8	27	80.6	47	116.6	68	154.4	88	190.4	145	293.0	245	473.0	400	752	1100	2012
–13	8.6	7	44.6	28	82.4	48	118.4	69	156.2	89	192.2	150	302.0	250	482.0	420	788	1200	2192
–12	10.4	8	46.4	29	84.2	49	120.2	70	158.0	90	194.0	155	311.0	255	491.0	440	824	1300	2372
–11	12.2	9	48.2	30	86.0	50	122.0	71	159.8	91	195.8	160	320.0	260	500.0	460	860	1400	2552
–10	14.0	10	50.0	31	87.8	51	123.8	72	161.6	92	197.6	165	329.0	265	509.0	480	896	1500	2732
– 9	15.8	11	51.8	32	89.6	52	125.6	73	163.4	93	199.4	170	338.0	270	518.0	500	932	1600	2912
– 8	17.6	12	53.6	33	91.4	53	127.4	74	165.2	94	201.2	175	347.0	275	527.0	520	968	1700	3092
– 7	19.4	13	55.4	34	93.2	54	129.2	75	167.0	95	203.0	180	356.0	280	536.0	540	1004	1800	3272
– 6	21.2	14	57.2	35	95.0	55	131.0	76	168.8	96	204.8	185	365.0	285	545.0	560	1040	1900	3452
- 5	23.0	15	59.0	36	96.8	56	132.8	77	170.6	97	206.6	190	374.0	290	554.0	580	1076	2000	3632
		16	60.8			57	134.6			98	208.4			295	563.0				

Spelter Solder

PRACTICE IN MIXING SPELTER SOLDER FOR USE ON BRASS AND STEEL TUBES

To Prepare Borax

Put sufficient quantity of Borax in pan to cover bottom of pan, heat over slow fire—an hour should be sufficient to dry out the borax. Borax should crumble in the fingers to fine powder.

To Prepare Solder

The Solder is mixed with Burnt Borax in the proportion of 10 pounds Solder to 1 pound of Borax. Add enough water while pounding for 1½ to 2 hours to bring to the consistency of putty. This mixture will serve as the supply.

To Use

Place a small quantity in a brazer's dish, thinning with water to about the consistency of cement for grouting. Apply this mixture to the articles. This formula can be changed to meet conditions.

PRACTICE IN MIXING SPELTER SOLDER ALLOYS FOR SHEET METAL AND CAST BUTTONS

Ten pounds 2 oz. Quick Running Gray Spelter Solder to 1 pound 10 oz. Burnt Borax. Shell must be cleaned before solder mixture is applied with small brush around the eye of button. The Solder mixture should set before going to the Gas Furnace to be fused. Button is then pickled and cleaned for finishing. In some cases the manufacturers use blow pipes for fusing the solder rather than continuous or automatic gas furnace, which method takes about a minute and a half for Solder to fuse.

White Brazing Solder—A white brazing solder which may be used with good results on iron and steel, according to the brass world, consists of copper, 45 per cent; zinc, 45 per cent, and nickel, 10 per cent. The use of the small quantity of nickel in the mixture gives the necessary whiteness and increases the melting point but slightly. In brazing steel or iron, silver solder, which flows readily without oxide and at a low temperature, is much to be preferred, but its expansiveness sometimes makes a suitable substitute desirable.

Tinsmiths' Solder—Tin, 1 pound; lead, 1 pound.

Plumbers' Solder—Tin, 2 pounds; lead, 5 pounds.

Hard Solder—Copper, 1 pound; zinc, 8 ounces.

Solder for Aluminum—Aluminum, 6 parts; zinc, 2 parts; phosphor-tin, 4 parts.

Solder for Gold—Gold, 3 pounds; silver, 1 pound; copper, 1 pound.

Solder for Silver—Copper, 2 pounds; silver, 1 ounce; sheet brass, 15 pounds.

Solder for Britannia—Tin, 7 pounds; lead, 4 pounds.

Yellow Solder—Copper and zinc, equal parts.

Black Solder—Copper, 2 pounds; zinc, 2 pounds; tin, 4 ounces.

To Keep Hot Lead From Sticking—Prepare a mixture of 1 quart powdered charcoal, ½ pint salt, 1 gill yellow prussiate of potash and lump of cyanide of potassium the size of a walnut. Apply this to the surface of the pot or to tools to be heated in the molten metal.

Melting Babbitt—Put a piece of resin, the size of a walnut, into your babbitt; stir thoroughly, then skim. It makes babbitt run better, and improves it. Babbitt will run in places with the resin in, where, without, it would not. It is also claimed that resin will prevent blowing when pouring in damp boxes—better still, warm them slightly before pouring.

A little pulverized charcoal put on top of melted babbitt or lead will reduce oxidation.

Fluxes

FOR SOLDERING OR WELDING

Copper and Brass	Sal Ammoniac
Iron	Borax
Lead	Tallow or Resin
Lead and Tin Pipes	Resin and Sweet Oil
Tinned Iron	Resin
Zinc	Chloride of Zinc

Steel—Pulverize together 1 part of sal ammoniac and 10 parts of borax and fuse until clear. When solidified, pulverize to powder.

Soldering or Tinning Acid—Muriatic acid, 1 pound; put into it all the zinc it will dissolve, and 1 ounce of sal ammoniac, then it is ready for use.

Tinning Acid for Brass and Copper—Muriatic acid, I pound; give it all the zinc it will dissolve; add 4 ounces sal ammoniac, 1 pint water.

Acid for Soldering Tin—Muriatic acid, 1 part; add all the zinc it will dissolve; then add 2 parts water and a little sal ammoniac.

Acid for Soldering Brass and Copper—Muriatic acid, 1 pound; zinc, 4 ounces; sal ammoniac, 5 ounces.

Acid for Soldering Zinc—Muriatic acid, 1 pound; sal ammoniac, 2 ounces; all the zinc it will dissolve; water, 3 pints.

Acid for Soldering Iron—Muriatic acid, 1 pound; sperm tallow, 6 ounces; sal ammoniac, 4 ounces.

Acid for Soldering Gold and Silver—Muriatic acid, 1 pound; sperm tallow, 8 ounces; sal ammoniac, 8 ounces.

Tinning Brass or Copper—Articles of brass or copper boiled in a solution of chlorite of potassium mixed with turnings or scraps of tin in a few moments become covered with a firmly attached layer of fine tin.

A similar effect is produced by boiling the articles with tin turnings or scraps and caustic alkali, or cream of tartar. In either way, articles made of copper or brass may be easily and perfectly tinned.

Tinning Iron or Steel—One ounce of sulphuric acid mixed with 8 ounces of granulated tin. Heat the mixture to the boiling point and pour over the work, after it has been well cleaned. Let the work stand for ten minutes and then stir well. Repeat this process once or twice according to thickness of the coating required. This will give good results on tacks, wire nail, etc.

Brazing Brass—The edges filed or scraped clean and bright, covered with spelter and powdered borax and exposed in a clear fire to a heat sufficient to melt the solder.

Soldering Brass—All kinds of brass may be soldered with Bath metal solder (79 copper, 21 zinc) or soft spelter, using borax as a flux. A good plan is to spread on a little paste of borax and water and lay a bit of tinfoil on this, then heating until the tin melts and runs and thus coats the surface. Work previously tinned in this way can be joined neatly and easily.

Composition for Welding—To 20 parts of iron filings, add 10 parts of borax and 1½ parts sal ammoniac and 1 part of balsam of copaiva or other resinous oil. Mix well, heated and pulverized. The surfaces to be united are powdered with this mixture; after which, place the article in the fire and let it come to a cherry red heat; when the composition melts take the portions to be welded from the fire and join together.

Mixture for Welding Steel—1 Sal-ammoniac, 10 Borax. Pounded together and fused until clear, when it is poured out, and after cooling, reduced to powder.

To Drill Hardened Steel—Cover your steel with melted beeswax; when coated and cold, make a hole in the wax with a fine pointed needle or other article the size of hole you require; put a drop of strong nitric acid upon it; after an hour, rinse off and apply again; it will gradually eat through. A mixture of one ounce of sulphate of copper, ¼ ounce of alum, ½ teaspoonful of powdered salt, 1 gill vinegar, and 20 drops of nitric acid will make a hole in steel that is too hard to cut or file easily.

A small hole drilled at the end of a crack in sheet steel will stop it from growing longer.

Straightening Hardened Steel—In hardening and tempering tools they sometimes spring, to the great annoyance of the workmen and not seldom the tool is reheated and rehardened. In most cases this may be avoided. To straighten a piece of steel already heated and tempered, heat it lightly—not enough to draw the temper—and it may be straightened by blows from a hammer, if the character of the tool will admit of such treatment, or, as in case of a tap, it may be straightened by a heavy mallet on a hardwood block. Although the steel, when cold, would break like glass with this treatment, when slightly warmed, it will yield to moderately heavy blows uninjured.

To Resharpen Old Files—Wash the files in warm potash water to remove the grease and dirt, then wash in warm water and dry by heat. Put 1½ pints warm water in a wooden vessel, put in the files, add 3 oz. blue vitriol finely powdered, 3 oz. borax. Mix well and turn the files so that every one may come in contact with the mixture. Add 10½ oz. sulphuric acid and ½ oz. cider vinegar. Remove the files after a short time, dry, rub with olive oil, wrap in porous paper. Coarse files should be kept in the mixture for a longer time than fine ones.

To Prevent Tools from Rusting—Melt half pound of lard; add a half ounce of camphor, stirring well and skimming off the scum; then stir 3 ounces of finely powdered graphite into the melted lard and camphor. Clean the tools, wipe them dry and smear them with this hot mixture. After twenty-four hours any surplus of the grease on them can be wiped off with a cloth or clean water.

How to Use Taps and Dies—Tapping or threading steel will be facilitated by a liberal use of lard oil, which is better than mineral oil. Keep a can handy for threading jobs. Cast iron should be threaded dry. Use kerosene for best results in threading aluminum.

Sharpening Cutters—Keep cutters sharpened properly. A dull cutter wears very rapidly and does poor work. As soon as there is any appearance of dullness in a cutter, pass it once or twice across a grinding wheel, which should be mounted upon a suitably designed machine. This in the long run will save time in sharpening, prolong the life of the cutters, and enable them to do their best and most rapid work. Formed cutters should have their teeth ground radially and so that they are all of the same height.

Tempering Color for Tools—After hardening, a tool should be polished and drawn as follows:

Lathe, planer and boring tools—Light straw.
Reamers, taps, scrapers—Dark straw.
Drills—Brown.
Wood bits, slitting saws, etc.—Light purple.
Cold chisels, punches—Blue.

Thermometer for Tempering—Use thermometer in a bath of oil. Place stock in same and you can get any temperature you want 395 F. is a very good temper for edged tools; 550 F. makes a good clock spring temper.

LUBRICANTS FOR CUTTING TOOLS

Material	Turning	Chucking	Drilling Milling	Reaming
Tool Steel	Dry or Oil	Oil or Soda Water	Oil	Lard Oil
Soft Steel	Dry or Soda Water	Soda Water	Oil or Soda Water	Lard Oil
Wrought Iron	Dry or Soda Water	Soda Water	Oil or Soda Water	Lard Oil
Copper	Dry	Oil	Oil	Mixture

Mixture is ⅓ Crude Petroleum, ⅔ Lard Oil.
Brass, Babbitt Metal and Cast Iron use no lubricant.

Screw Lubricant—Put hard soap on lag screws, wood screws, or any screw for wood. It will surprise you how much easier they will turn in.

Lubricant for Heavy Journals—One pound of powdered graphite to 4 pounds of tallow well ground together. About ½ pound of powdered camphor gum will add much to the wearing quality of the lubricant.

Sal Soda for Turning—Strong sal soda water or soapy water is much better than clean water, to use where water cuts are being taken, either on lathe or planer.

Filing Lubricant—Oil or chalk rubbed on a file will make it cut smoother on steel or wrought iron, but it cuts slower. The oil may afterward be removed by rubbing with chalk and brushing off with a file card.

In filing cast iron, brass, or copper, no lubricant is used.

File Pinning—In filing steel or wrought iron, the file is liable to "pin," that is, the filings become wedged between the teeth. This may be prevented to an extent by filling the spaces with chalk or oil, or both. If a file card fails to remove filings, use a thin piece of soft iron, not hard steel.

Sealing Gasoline Joints—Common rosin soap applied to screw joints or surfaces of fittings will prevent any leakage of gasoline.

Anti-Rust Compound for Machinery—Dissolve 1 ounce camphor in 1 pound melted lard, skim off and stir in about 3 ounces powdered graphite. Clean the machinery and paint with a brush and allow one day to dry, then rub off the mixture with a soft cloth.

To Prevent Rusting—Boiled linseed oil will keep polished tools from rusting if it is allowed to dry on them. Common sperm oil will prevent them from rusting for a short period. A coat of copal varnish is frequently applied to polished tools exposed to the weather.

BREAKING GLASS TO ANY DESIRED DESIGN

Make a small notch by means of a file on the edge of the glass, then heat the end of an iron rod red hot and apply the iron to the notch, drawing it slowly along the surface of the glass in any direction desired, and a crack will follow the direction.

Drilling Glass or Other Hard Materials—This is done very readily with a common drill, by using a mixture of turpentine and camphor. When the point of the drill has come through it should be taken out and the hole worked through with the point of a three-cornered file, having the edges ground sharp. Use the corners of the file, scraping the glass rather than using the file as a reamer. Great care must be taken not to crack the glass or flake off parts of it in finishing the hole after the point of the drill has come through. Use the mixture freely during the drilling and scraping. The above mixture will be found very useful in drilling hard cast iron. Tempered steel can be drilled by making the drill very hard and using this mixture in the proportion of one part spirits of camphor to four parts turpentine.

LENGTH OF OPEN BELTS

To find the length of an open belt, pass a steel tape around the pulleys. Cut the belt to this length if a single belt, but add twice the thickness of the belt if a double belt.

The length of small belts may be found by passing the belt around pulleys and straining with hand pull.

New belts stretch and become slack after a short time and the slack should be taken up. With large belts, stretching may be anticipated by cutting the belt one inch shorter for every ten feet.

Rule for Length of Open Belt:

Add diameter of pulleys in inches and multiply sum by 1.57, then add to product twice the distance between centers in inches.

Formula for Length of Open Belt:

$$L=3.14\ (R+r)+2D+\frac{(R-r)^2}{D}$$

R=radius of large pulley.
r=radius of small pulley.
D=distance between centers of shaft.
L=length of belt.

Rule for Length of Crossed Belts:

When pulleys are in place, find length with a tape, but if not in place use this formula:

$$L=3.14\ (R+r)+2D+\frac{(R-r)^2}{D}$$

R=radius of large pulley.
r=radius of small pulley.
D=distance between centers of shaft.
L=length of belt.

For double belt, add the thickness of belt to the diameters of pulleys.

LEATHER BELTING CEMENT

Take of common glue and American isinglass equal parts; place them in a boiler and add water sufficient to just cover the whole. Let it soak ten hours, then bring the whole to a boiling heat and add pure tannin, until the whole becomes ropy or appears like the white of eggs. Apply it warm. Buff the grain off the leather, where it is to be cemented; rub the joint surfaces solidly together, let it dry a few hours and it is ready for practical use; and if properly put together, it will not need riveting, as the cement is nearly of the same nature as the leather itself.

TO PRESERVE BELTS

A very little pure lard oil or neatsfoot oil will preserve belts and prevent them from cracking. Castor oil and vaseline are also used.

TO CLEAN BELTS

If the belting is not brittle or rotten, a thorough wiping off of the excess of oil and scraping the face with a sharp tool to take off the gummy matter and finally wiping the inside with a little naptha or gasoline upon a cloth, will generally restore the belt. The pulley should be cleaned also. If the belting has become weak and rotten, it should be thrown away.

LUBRICATOR FOR BELTS

Five parts of India rubber are cut fine and melted together with 5 parts oil of turpentine in an iron, well covered vessel; then add 4 parts of resin, stir well, melt and add 4 parts of yellow wax, stirring constantly while melting. This mixture, while warm, is added, with constant stirring, to a melted mixture of 15 parts of fish oil and 5 parts of tallow and the whole is agitated until it has congealed. The mass is applied to old belts upon both sides in a warm place and when the belts are in use, from time to time, upon the inner side. By this treatment they become very durable.

RULES FOR CALCULATING SPEED OF PULLEYS

Problem 1. The diameter of the driver and driven being given, to find the number of revolutions of the driven:

Rule. Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions.

Problem 2. The diameter and the revolutions of the driver being given, to find the diameter of the driven, that shall make any given number of revolutions in the same time:

Rule. Multiply the diameter of the driver by its number of revolutions and divide the product by the number of revolutions of the driven; the quotient will be its diameter.

Problem 3. To ascertain the size of the driver:

Rule. Multiply the diameter of the driven by the number of revolutions you wish to make, and divide the product by the revolutions of the driver; the quotient will be the size of the driver.

The above rules are practically correct. Though, owing to the slip, elasticity and thickness of the belt, the circumference of the driven seldom runs as fast as the driver.

Belts, like gears, have a pitch-line, or a circumference of uniform motion. The circumference is within the thickness of the belt, and must be considered if pulleys differ greatly in diameter and a required speed is absolutely necessary.

ROPE DATA

The Following Rope Information is based upon calculations for new manila rope without knots. In estimating the breaking strength of rope the following formula from Hunt and Miller has been used. Breaking strength equals 720 times the square of the circumference in inches. The safe load for any rope represents the greatest load that should be placed upon a single rope for its most economical wear. It will be seen in these tables that the safe load as given in the sixth column is about one-eighth the breaking load given in the sixth column.

Pulley Diameters for best results with a given sized rope. As ropes pass over pulleys there is a constant bending and straightening. This causes the strands to chafe one another at the center. The larger the rope and the smaller the pulley the greater the wear. Hence to avoid the serious wear on a hoisting rope it should be run over a pulley of a diameter not less than 8 times the diameter of the rope in inches. For example a ¾-inch hay rope requires a 6-inch pulley, a 1-inch rope an 8-inch pulley. Ropes used for transmitting power, as is required in the case of belts, should not be run over pulleys less than 40 times the diameter of the rope.

Kinds of Rope. At the present time rope is made chiefly from sisal or manila hemp. The former which is the whiter and cheaper fiber, comes from Yucatan; the latter from the Philippine Islands, and receives its name from the chief port of shipment. Rope is also made of cotton and of wire. Wire and hemp rope is used principally for industrial work, while cotton rope is used about the house and other uses where a soft pliable rope is required.

A rope is composed of a certain number of strands, the strand itself being made up of a number of single threads or yarns. Three strands laid or twisted together form a hawser-laid rope, and three such hawsers similarly laid make a cable-laid rope or a cable. A shroud-laid rope usually consists of four strands around a central strand or core. The prepared fiber is twisted or spun in the right hand to form a yarn; the required number of yarns receive a left hand twist to make a strand; three strands twisted to the right make a hawser, and three hawsers twisted to the left form a cable. Thus the twist in each operation is in a different direction from that of the preceding one and this alteration of direction serves, to some extent, to keep the rope in its proper form.

Why Rope is Twisted. The primary object of twisting fibers together into a rope is to hold together the strands when a strain is applied. Twisting also compacts the fibres and prevents, to some extent, the penetration of moisture. The proper degree of twist in ropes is generally such that the rope is from three-fourths to two-thirds the length of yarn composing it. Hence, when a weight is hung on the end of a rope, there is a tendency to untwist and become longer. In thus untwisting the strands will loosen, the weight will revolve and the yarns in the strands will tighten until the strain upon them equals the strain upon the strands. In making rope the aim is to make the tension on the strands and on the yarns composing the strands equal. But since this is impossible, it is always necessary to take out the turns in a new rope for the first two or three days that it is used. In case a new rope is inclined to be so kinky that it cannot be used the twist may be removed by tying it to a vehicle and dragging it about on the ground.

Tap and Die Information

GLOSSARY OF TERMS

Used in Connection with the Cutting and Measuring of Screw Threads

A tendency toward carelessness in expression has resulted in restricting many terms and unduly broadening others. The interchangeability of many terms is not thoroughly understood. To describe an operation machinists use different expressions than terms used by superintendents and mechanical engineers.

Allowance. British terms for variation in dimensions to allow for different qualities of fit.

Angle (Helical). Or lead. The angle of the thread to the axis at the pitch line or at pitch diameter.

Angle of thread. The total or included angle between the sides or walls of a thread, measured on the axial line.

Chamfer. The taper toward point of tap made by cutting away the tops of the threads. It is customary also to relieve slightly the chamfered threads. (See **"Relief."**)

Clearance Angular. Allowance on the angles of the thread for screw threads to fit together.

Clearance Bottom. Allowance or space at bottom of threads to prevent a bearing except on angle of threads.

Clearance Top. Allowance at the apex of a screw thread in order to clear bottom of mating thread.

Diameter External. The outside measurement over the top of the thread of a tap or screw.

Diameter Pitch. The measurement on the angle of the thread at an imaginary line (called the pitch line) located in the threads between the top and bottom at a point where the width of the land and space are the same and equal to one-half the pitch. In practice this is measured by a thread caliper or micrometer.

Flute. The groove cut in taps and reamers to make the cutting edge and allow room for chips.

Gage Limit. A gage having two sizes, the difference between them representing the tolerance or allowable variations. One size must "go" into or over the work, while the other must "not go". Should be called "tolerance gage" unless dimensions or "limits" are marked on the gage.

Gage Reference. The gage by which the workman's gage is tested. The reference gage is compared with the master gage.

Gage Workman's. The gage used by the workman in inspecting the product. Tested periodically by the reference gage.

Land. The threaded portions of a tap after the flutes have been formed.

Lead. The longitudinal distance which a screw thread advances when turned one complete revolution. Do not confuse lead with pitch or chamfer.

Pitch. The distance between two adjacent threads (from center to center). Correctly expressed in fractions, as "1/12 inch" but commonly as "12 threads per inch."

Rake. The angle of the cutting edge of the teeth of a tap or die.

Relief. Any clearance allowed back of the cutting edge to reduce friction; whether on the top, bottom or wall of thread.

Root. Bottom of thread.

Threads per Inch. The number of threads per inch of linear measurements, as measured with a pitch gage. The reciprocal of the pitch.

Thread Single. A thread in which the lead is equal to the pitch.

Thread Double. A thread in which the lead is equal to two times the pitch.

Thread Triple. A thread in which the lead is equal to three times the pitch.

Thread Quadruple. A thread in which the lead is equal to four times the pitch.

In ordering double, triple or quadruple threads, be sure to specify both pitch and lead; as 1-12 inch, 1-6 lead double (or triple) thread. In no other way can an understanding be assured.

Electricity

Electricity is a name derived from the Greek word "electron"—amber. It was discovered more than 2000 years ago that amber, when rubbed, possessed the curious property of attracting light bodies.

There are certain bodies, which when warm and dry, acquire by friction the property of attracting feathers, filaments of silk or, indeed, any light body toward them. This body is called electricity and bodies which possess it are said to be electrified.—Linaeus Cumming.

The production of electricity is simply a transformation of energy from one form into another; usually mechanical energy is changed into electrical energy and a dynamo is simply a device for effecting the transformation.

Energy is the capacity for doing work. Steam under pressure is an example.

Matter is anything occupying space which is of three dimensions —wide, long, deep—and which prevents other matter from occupying the same space at the same time.

An atom is the smallest quantity of matter which can exist and means that which cannot be cut, scratched or changed in form, although atoms possess a definite size and mass.

A molecule is composed of two or more atoms.

To sustain a current of electricity requires energy. To sustain magnetism requires no energy.

The volt is measure unit of electro-motive force or electrical pressure; not power. This electromotive force will maintain a current of one ampere in current whose resistance is one ohm.

The ampere is the measure unit denoting the strength of an electric current or the rate of the flow of electricity. It is that strength of current, or rate of flow, which would be maintained in a circuit whose resistance is one ohm by an electro-motive force of one volt.

The ohm is the practical unit of resistance. It is that resistance which will limit the flow of an electric current under an electromotive force of one volt to one ampere.

In electrotechnics the electro-motive force, or electrical potential expressed in volts, corresponds with the pressure or head of water and the resistance in ohms to the friction in the pipe.

Coulomb—Unit of quantity. Quantity of current which, impelled by 1 volt, would pass through 1 ohm in 1 second.

Farad—Unit of capacity. A conductor or condenser which will hold one coulomb under the pressure of one volt.

Joule—Unit of work. Work done by 1 watt in 1 second.

Watt—The unit of electrical energy, and is the product of ampere and volt. That is one ampere of current flowing under a pressure of one volt gives one watt of energy.

One **electrical horsepower** is equal to 746 watts.

One Kilowatt is equal to 1,000 watts.

To find the **watts** consumed in a given electrical circuit, such as a lamp, multiply the volts by the amperes.

To find the **volts,** divide the watts by the amperes.

To find the **amperes,** divide the watts by the volts.

To find the **electrical horsepower** required by a lamp, divide the watts of the lamp by 746.

To find the **number of lamps** that can be supplied by one electrical horsepower of energy, divide 746 by the watts of the lamp.

To find the **electrical horsepower** necessary, multiply the watts per lamp by the number of lamps, and divide by 746.

To find the **mechanical horsepower** necessary to generate the required electrical horsepower, divide the latter by the efficiency of the generator.

To find the **amperes** of a given circuit, of which the volts and ohms resistance are known, divide the volts by the ohms.

To find the **volts,** when the amperes and watts are known, multiply the amperes by the ohms.

To find the **resistance in ohms,** when the volts and amperes are known, divide the volts by the amperes.

Cement for Joining Metals to Wood, Leather and Glass. Rosin, 50 parts; burnt umber, 10 parts; calcined plaster, 5 parts; a little boiled oil improves it.

To Cement Brass Work to Glass. Mix together 2 parts litharge, 1 part white lead, 3 parts linseed oil and 1 part gum copal; use immediately.

Stone and Iron Cement. When stone and iron are to be cemented together, use a compound of equal parts of pitch and sulphur.

Reliable Paste for Sticking on Tin. To 8 ounces flour, 4 ounces brown sugar, 1 ounce bicarb-soda, add 5 ounces cold water. Mix the above thoroughly until free from lumps. Then add one and one-half pounds boiling water and cook for a short time, continuously stirring. After the paste is made, and while still hot, add one-half ounce sulphuric acid.

Rust Joint Cement. (Quickly Setting). 1 Sal-ammoniac in powder (by weight). 2 flour of sulphur, 80 iron borings made to a paste with water.

Rust Joint Cement. (Slowly Setting). 2 Sal-ammoniac, 1 flour of sulphur, 200 iron borings.

The latter cement is the best if the joint is not required for immediate use.

Red Lead Cement for Face Joints. 1 of white lead, 1 of red lead, mixed with linseed oil to the proper consistency.

Rust Joint Cement. Ten parts of iron filings and 3 parts chloride of lime mixed with water to form a paste. Apply to the joint and fasten securely together by pressure; allow 12 hours to set. The iron will break before the joint.

Cement for Coppersmiths. Boiled linseed oil and red lead, mixed to the consistency of putty, is a good cement for stopping joints and cracks in copper pipe.

Cement for Glass—Also China, Earthen and Stoneware. India-rubber, 1 part; chloroform, 60 parts; white shellac, 6 parts; gum mastic, 20 parts; shake frequently for two or three days and it will be ready for use.

Glue to Resist Moisture. 1 pound of glue melted in 2 quarts of skim milk.

Marine Glue. 1 of India rubber, 12 of mineral naphtha or coal tar. Heat gently, mix, and add 20 of powdered shellac. Pour out on a slab to cool. When used, to be heated to about 250°.

Glue Cement to Resist Moisture. 1 glue, 1 black resin, ¼ red ochre, mixed with least possible quantity of water, or: 4 of glue, or 1 oxide of iron, 1 of boiled oil (by weight).

Rough Brass Fittings

ROUGH BRASS FITTINGS—Iron Pipe Sizes

Approximate weight 100 pieces—In pounds

Article	⅛	¼	⅜	½	¾	1
Street elbows	6.16	7.81	14.74	31.2	49.1	69.36
45° street ells	4.73	8.33	13.	19.3	24.2	44.15
Elbows	5.38	7.58	13.49	20.63	29.85	47.98
Plain tees	7.67	11.04	18.88	29.08	37.5	63.99
Crosses	9.37	7.3	32.69	31.	67.39	75.
Caps	3.13	6.25	7.81	10.49	15.47	29.69
Couplings	3.12	7.43	11.	16.08	25.69	45.91
Plugs	1.823	3.646	4.85	7.81	12.45	18.71
Locknuts	3.12	4.69	5.48	6.09	13.02	20.05

Article	1¼	1½	2	2½	3
Street elbows	115.6	164.1	236.3	.....	.....
45° street ells	52.88	75.27	126.9	221.6	394.
Elbows	71.58	86.92	155.1	254.	432.6
Plain tees	79.06	104.4	200.8	325.	592.5
Crosses	102.9	202.3	228.7	537.5	756.3
Caps	51.56	62.5	108.4	139.3	140.6
Couplings	59.7	87.5	122.2	193.7	233.9
Plugs	31.44	45.02	73.49	95.34	167.5
Locknuts	26.45	34.23	55.97	150.	253.1

Regular Polygons

No. of sides	Name	Area when diameter of inscribed circle = 1	Area when side = 1
3	Triangle	1.299	.433
4	Square	1.000	1.000
5	Pentag	.908	1.720
6	Hexag	.866	2.598
7	Heptag	.843	3.634
8	Octag	.828	4.828
9	Nonag	.819	6.182
10	Decag	.812	7.694
11	Undecag	.807	9.366
12	Dodecag	.804	11.196

No. of sides	Length of side when perpendicular = 1	Perpendicular when side = 1	Radius of circumscribed circle when side = 1	Length of side when radius of circumscribed circle = 1
3	3.464	.289	.577	1.732
4	2.000	.500	.707	1.414
5	1.453	.688	.851	1.176
6	1.155	.866	1.000	1.000
7	.963	1.039	1.152	.868
8	.828	1.207	1.307	.765
9	.728	1.347	1.462	.684
10	.650	1.539	1.618	.618
11	.587	1.703	1.775	.563
12	.536	1.866	1.932	.518

Area of any regular polygon = radius of inscribed circle × number of sides × length of one side ÷ 2.

Rules Relative to the Circle

Diameter of circle that shall contain area of a given square = side of square × 1.1284.

To find the surface of a sphere or globe—Multiply the diameter by the circumference; or multiply the square of diameter by 3.1416; or multiply four times the square of radius by 3.1416.

To find the side of equal square—Multiply diameter by 0.8862; or divide diameter by 1.1284; or multiply circumference by 0.2821; or divide circumference by 3.545.

To find the side of an inscribed square—Multiply diameter by 0.7071; or multiply circumference by 0.2251; or divide circumference by 4.4428.

Square—A side × 1.1442 = diameter of its circumscribing circle.
A side × 4.443 = circumference of its circumscribing circle.
A side × 1.128 = diameter of an equal circle.
A side × 3.547 = circumference of an equal circle.

Square inches × 1.273 = circle inches of an equal circle.

To find circumference—Multiply diameter by 3.1416; or divide diameter by 0.3183.

To find diameter—Multiply circumference by 0.3183; or divide circumference by 3.1416.

To find the diameter of a circle having given area—Divide the area by .7854, and extract the square root.

To find radius—Multiply circumference by 0.15915; or divide circumference by 6.28318.

To find the area of a circle—Multiply circumference by ¼ of the diameter; or multiply the square of diameter by 0.7854; or multiply the square of circumference by .07958; or multiply the square of ½ diameter by 3.1416.

Sector of circle = length of arc × half radius.

Segment of circle = area of sector or equal radius, — area of triangle, when the segment is less, and + area of triangle, when the segment is greater than the semi-circle.

Area of circular ring = diameters of the two circles × difference of diameter and that product by .7854.

Convex surface of segment of sphere = height of segment × circumference of the sphere of which it is a part.

Tap Drills

For A. S. M. E. Machine Screw Threads			For A. S. M. E. Machine Screw Threads			For United States Form of Threads		For United States Form of Threads	
Size Tap	Size of Drill Hole for Tapping	Clearance Drill for Outside Diameter of Machine Screw	Size Tap	Size of Drill Hole for Tapping	Clearance Drill for Outside Diameter of Machine Screw	Size Tap	Size of Drill Hole for Tapping	Size Tap	Size of Drill Hole for Tapping
0-80	55	52	10-28	21	10	1/8 -32	42	1/2 -13	27/64
1-64	53	48	10-30	20	10	1/8 -40	39	1/2 -20	7/16
1-72	52	48	10-32	20	10	5/32-32	30	9/16-12	15/32
2-56	49	43	12-24	15	2	5/32-36	30	9/16-18	1/2
2-64	48	43	12-28	14	2	3/16-24	28	5/8 -11	17/32
3-48	45	38	12-32	13	2	3/16-32	23	5/8 -12	17/32
3-56	44	38	14-20	9	D	7/32-24	17	5/8 -18	9/16
4-32	44	32	14-24	6	D	7/32-32	13	3/4 -10	41/64
4-36	43	32	16-18	2	I	1/4 -20	8	3/4 -12	21/32
4-40	42	32	16-20	2	I	1/4 -24	5	3/4 -16	43/64
4-48	41	32	16-22	1	I	1/4 -27	4	7/8 - 9	3/4
5-32	39	30	18-18	C	N	1/4 -28	4	7/8 -12	25/32
5-40	37	30	18-20	D	N	1/4 -32	3	7/8 -14	51/64
5-44	36	30	20-16	H	P	5/16-18	E	1 - 8	55/64
6-32	34	28	20-18	I	P	5/16-20	F	1 -14	59/64
6-36	33	28	20-20	J	P	5/16-24	H	1 1/8 - 7	61/64
6-40	32	28	22-18	M	T	3/8 -16	N	1 1/8 -12	1 1/32
7-36	30	23	24-16	O	W	3/8 -18	O	1 1/4 - 7	1 5/64
8-30	29	19	24-18	O	W	3/8 -20	O	1 1/4 -12	1 5/32
8-32	29	19	26-16	R	Y	3/8 -24	Q	1 3/8 - 6	1 11/64
8-36	28	19	28-14	T	7/16"	7/16-14	T	1 3/8 -12	1 21/32
9-32	24	15	30-14	V	15/32"	7/16-20	V	1 1/2 - 6	1 19/64
10-24	23	10	34-13	Y	33/64"	1/2 -12	13/32	1 1/2 -12	1 13/32

These drill sizes will not give a full thread, but are not too large for practical purposes.

Continuous Drill Table

Deci. Inch	Frac. Inch	Drill No.	Deci. Inch	Frac. Inch	Drill No.	Deci. Inch	Frac. Inch	Drill No.	Deci. Inch	Frac. Inch	Drill No.
.0135	.....	80	.0935	.....	42	.201	.....	7	.397	.....	X
.0145	.....	79	.0938	3/32	....	.203	13/64	....	.404	.....	Y
.0156	1/64	....	.0960	.....	41	.204	.....	6	.406	13/32	....
.0160	.....	78	.0980	.....	40	.206	.....	5	.413	.....	Z
.0180	.....	77	.0995	.....	39	.209	.....	4	.422	27/64	....
.0200	.....	76	.1015	.....	38	.213	.....	3	.438	7/16	....
.0210	.....	75	.1040	.....	37	.219	7/32	....	.453	29/64	....
.0225	.....	74	.1065	.....	36	.221	.....	2	.469	15/32	....
.0240	.....	73	.1094	7/64	....	.228	.....	1	.484	31/64	....
.0250	.....	72	.1100	.....	35	.234	.....	A	.500	1/2	....
.0260	.....	71	.1110	.....	34	.234	15/64	....	.516	33/64	....
.0280	.....	70	.1130	.....	33	.238	.....	B	.531	17/32	....
.0292	.....	69	.116	.....	32	.242	.....	C	.547	35/64	....
.0310	.....	68	.120	.....	31	.246	.....	D	.562	9/16	....
.0313	1/32	....	.125	1/8	....	.250	1/4	....	.578	37/64	....
.0320	.....	67	.129	.....	30	.250	.....	E	.594	19/32	....
.0330	.....	66	.136	.....	29	.257	.....	F	.609	39/64	....
.0350	.....	65	.140	9/64	....	.261	.....	G	.625	5/8	....
.0360	.....	64	.141	.....	28	.266	17/64	....	.641	41/64	....
.0370	.....	63	.144	.....	27	.266	.....	H	.656	21/32	....
.0380	.....	62	.147	.....	26	.272	.....	I	.672	43/64	....
.0390	.....	61	.150	.....	25	.277	.....	J	.688	11/16	....
.0400	.....	60	.152	.....	24	.281	9/32	....	.703	45/64	....
.0410	.....	59	.154	.....	23	.281	.....	K	.719	23/32	....
.0420	.....	58	.156	5/32	....	.290	.....	L	.734	47/64	....
.0430	.....	57	.157	.....	22	.295	.....	M	.750	3/4	....
.0465	.....	56	.159	.....	21	.297	19/64	....	.766	49/64	....
.0469	3/64	....	.161	.....	20	.302	.....	N	.781	25/32	....
.0520	.....	55	.166	.....	19	.313	5/16	....	.797	51/64	....
.0550	.....	54	.170	.....	18	.316	.....	O	.813	13/16	....
.0595	.....	53	.172	11/64	....	.323	.....	P	.828	53/64	....
.0625	1/16	....	.173	.....	17	.328	21/64	....	.844	27/32	....
.0635	.....	52	.177	.....	16	.332	.....	Q	.859	55/64	....
.0670	.....	51	.180	.....	15	.339	.....	R	.875	7/8	....
.0700	.....	50	.182	.....	14	.344	11/32	....	.891	57/64	....
.0730	.....	49	.185	.....	13	.348	.....	S	.906	29/32	....
.0760	.....	48	.188	3/16	....	.358	.....	T	.922	59/64	....
.0781	5/64	....	.189	.....	12	.359	23/64	....	.938	15/16	....
.0785	.....	47	.191	.....	11	.368	.....	U	.953	61/64	....
.0810	.....	46	.194	.....	10	.375	3/8	....	.969	31/32	....
.0820	.....	45	.196	.....	9	.377	.....	V	.984	63/64	....
.0860	.....	44	.199	.....	8	.386	.....	W	1.000	1	....
.0890	.....	43				.391	25/64	....			

If you need additional copies of this catalogue—just write or telegraph.

Capacity of Tanks

Per Foot of Depth
U. S. Gallons—231 Cu. In.

CIRCULAR TANKS

Diameter Ft.	Diameter In.	Gallons	Diameter Ft.	Diameter In.	Gallons	Diameter Ft.	Diameter In.	Gallons	Diameter Ft.	Diameter In.	Gallons
1	0	5.875	2	8	41.78	4	5	114.6	8	3	399.9
1	1	6.895	2	9	44.43	4	6	119.0	8	6	424.5
1	2	7.997	2	10	47.16	4	7	123.4	8	9	449.8
1	3	9.180	2	11	49.98	4	8	127.9	9	0	475.9
1	4	10.44	3	0	52.88	4	9	132.6	9	3	502.7
1	5	11.79	3	1	55.86	4	10	137.3	9	6	530.2
1	6	13.22	3	2	58.92	4	11	142.0	9	9	558.5
1	7	14.73	3	3	62.06	5	0	146.9	10	0	587.5
1	8	16.32	3	4	65.28	5	3	161.9	10	3	617.3
1	9	17.99	3	5	68.58	5	6	177.7	10	6	647.7
1	10	19.75	3	6	71.97	5	9	194.2	10	9	679.0
1	11	21.58	3	7	75.44	6	0	211.5	11	0	710.9
2	0	23.50	3	8	78.99	6	3	229.5	11	3	743.6
2	1	25.50	3	9	82.62	6	6	248.2	11	6	777.0
2	2	27.58	3	10	86.33	6	9	267.7	11	9	811.1
2	3	29.74	3	11	90.13	7	0	287.9	12	0	846.0
2	4	31.99	4	0	94.00	7	3	308.8	12	3	881.6
2	5	34.31	4	1	97.96	7	6	330.5	12	6	918.0
2	6	36.72	4	2	102.0	7	9	352.9	12	9	955.1
2	7	39.21	4	3	106.1	8	0	376.0	13	0	993.3
			4	4	110.3						

RECTANGULAR TANKS

Length Ft.	Length In.	Width—Feet and Inches 2-0	2-6	3-0	3-6	4-0	4-6	5-0	5-6	6-0	6-6
2	0	29.92	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	6	37.40	46.75	.....	.....	.....	.....	.....	.....	.....	.....
3	0	44.88	56.10	67.32	.....	.....	.....	.....	.....	.....	.....
3	6	52.36	65.45	78.55	91.64	.....	.....	.....	.....	.....	.....
4	0	59.84	74.81	89.77	104.7	119.7	.....	.....	.....	.....	.....
4	6	67.32	84.16	101.0	117.8	134.6	151.5	.....	.....	.....	.....
5	0	74.81	93.51	112.2	130.9	149.6	168.3	187.0	.....	.....	.....
5	6	82.29	102.9	123.4	144.0	164.6	185.1	205.7	226.3	.....	.....
6	0	89.77	112.2	134.6	157.1	179.5	202.0	224.4	246.9	269.3	.....
6	6	97.25	121.6	145.9	170.2	194.5	218.8	243.1	267.4	291.7	316.1
7	0	104.7	130.9	157.1	183.3	209.5	235.6	261.8	288.0	314.2	340.4
7	6	112.2	140.3	168.3	196.4	224.4	252.5	280.5	308.6	336.6	364.7
8	0	119.7	149.6	179.5	209.5	239.4	269.3	299.2	329.1	359.1	389.0
8	6	127.2	159.0	190.8	222.5	254.3	286.1	317.9	349.7	381.5	413.3
9	0	134.6	168.3	202.0	235.6	269.3	303.0	336.6	370.3	403.9	437.6
9	6	142.1	177.7	213.2	248.7	284.3	319.8	355.3	390.9	426.4	461.9
10	0	149.6	187.0	224.4	261.8	299.2	336.6	374.0	411.4	448.8	486.2
10	6	157.1	196.4	235.6	274.9	314.2	353.5	392.7	432.0	471.3	510.5
11	0	164.6	205.7	246.9	288.0	329.1	370.3	411.4	452.6	493.7	534.9
11	6	172.1	215.1	258.1	301.1	344.1	387.1	430.1	473.1	516.2	559.2
12	0	179.5	224.4	269.3	314.2	359.1	403.9	448.8	493.7	538.6	583.5

Length Ft.	Length In.	Width—Feet and Inches 7-0	7-6	8-0	8-6	9-0	9-6	10-0	10-6	11-0	11-6	12-0
7	0	366.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	6	392.7	420.8	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	0	418.9	448.8	478.8	.....	.....	.....	.....	.....	.....	.....	.....
8	6	445.1	476.9	508.7	540.5	.....	.....	.....	.....	.....	.....	.....
9	0	471.3	504.9	538.6	572.3	605.9	.....	.....	.....	.....	.....	.....
9	6	497.5	533.0	568.5	604.1	639.6	675.1	.....	.....	.....	.....	.....
10	0	523.6	561.0	598.4	635.8	673.2	710.6	748.1	.....	.....	.....	.....
10	6	549.8	589.1	628.4	667.6	706.9	746.2	785.5	824.7	.....	.....	.....
11	0	576.0	617.1	658.3	699.4	740.6	781.7	822.9	864.0	905.1	.....	.....
11	6	602.2	645.2	688.2	731.2	774.2	817.2	860.3	903.3	946.3	989.3	.....
12	0	628.4	673.2	718.1	763.0	807.9	852.8	897.7	942.5	987.4	1032.	1077.

We solicit your business on Perforated Metals of all kinds. See page 22.

Circumferences, Areas, Squares, Cubes, Square and Cube Roots

Note—To find the 4th power (or biquadrate) of a number, multiply the square by the square. To find the 4th root, extract the square root twice in succession.

Advancing by 8ths and 4ths. 1 to 9¾.

Dia. or No.	Circum.	Area	Sqr.	Cube	Sqr. Root	Cube Root
1	3.14	.785	1.	1.	1.	1.
⅛	3.53	.994	1.27	1.42	1.060	1.040
¼	3.93	1.227	1.56	1.95	1.118	1.077
⅜	4.32	1.485	1.89	2.60	1.173	1.112
½	4.71	1.767	2.25	3.38	1.225	1.145
⅝	5.11	2.074	2.64	4.29	1.275	1.176
¾	5.50	2.405	3.06	5.36	1.323	1.205
⅞	5.89	2.761	3.52	6.59	1.369	1.233
2	6.28	3.142	4.	8.	1.414	1.260
⅛	6.68	3.547	4.52	9.59	1.458	1.286
¼	7.07	3.976	5.06	11.39	1.5	1.310
⅜	7.46	4.430	5.64	13.40	1.541	1.334
½	7.85	4.909	6.25	15.63	1.581	1.358
⅝	8.25	5.412	6.89	18.08	1.620	1.380
¾	8.64	5.940	7.56	20.79	1.658	1.402
⅞	9.03	6.492	8.27	23.76	1.695	1.422
3	9.42	7.07	9.	27.	1.732	1.442
⅛	9.82	7.67	9.77	30.52	1.768	1.462
¼	10.21	8.30	10.56	34.32	1.803	1.482
⅜	10.60	8.95	11.39	38.44	1.837	1.5
½	11.00	9.62	12.25	42.88	1.871	1.518
⅝	11.39	10.32	13.14	47.63	1.904	1.535
¾	11.78	11.05	14.06	52.73	1.936	1.553
⅞	12.17	11.79	15.02	58.17	1.968	1.570
4	12.57	12.57	16.	64.	2.	1.587
¼	13.35	14.19	18.06	76.78	2.061	1.619
½	14.14	15.90	20.25	91.13	2.121	1.651
¾	14.92	17.72	22.56	107.16	2.179	1.681
5	15.71	19.63	25.	125.	2.236	1.710
¼	16.49	21.64	27.56	144.70	2.291	1.738
½	17.28	23.76	30.25	166.37	2.345	1.765
¾	18.06	25.97	33.06	190.11	2.398	1.792
6	18.85	28.29	36.	216.	2.449	1.817
¼	19.64	30.68	39.06	244.14	2.5	1.832
½	20.42	33.18	42.25	274.63	2.550	1.866
¾	21.21	35.78	45.56	307.55	2.599	1.890
7	21.99	38.48	49.	343.	2.646	1.913
¼	22.78	41.28	52.56	381.08	2.692	1.935
½	23.56	44.18	56.25	421.88	2.739	1.957
¾	24.35	47.17	60.06	465.48	2.784	1.979
8	25.13	50.26	64.	512.	2.828	2.
¼	25.92	53.46	68.06	561.52	2.872	2.021
½	26.70	56.75	72.25	614.12	2.915	2.041
¾	27.49	60.13	76.56	669.92	2.958	2.061
9	28.27	63.62	81.	729.	3.	2.080
¼	29.06	67.20	85.56	791.45	3.041	2.098
½	29.85	70.88	90.25	857.37	3.082	2.118
¾	30.63	74.66	95.06	926.86	3.122	2.136

Dia. or No.	Circum.	Area	Sqr.	Cube	Sqr. Root	Cube Root
10	31.41	78.54	100	1000	3.162	2.154
11	34.55	95.03	121	1331	3.317	2.224
12	37.69	113.0	144	1728	3.464	2.289
13	40.84	132.7	169	2197	3.606	2.351
14	43.98	153.9	196	2744	3.742	2.410
15	47.12	176.7	225	3375	3.873	2.466
16	50.26	201.0	256	4096	4.	2.520
17	53.40	226.9	289	4913	4.123	2.571
18	56.54	254.4	324	5832	4.243	2.621
19	59.69	283.5	361	6859	4.359	2.668
20	62.83	314.1	400	8000	4.472	2.714
21	65.97	346.3	441	9261	4.583	2.759
22	69.11	380.1	484	10648	4.690	2.802
23	72.25	415.4	529	12167	4.796	2.844
24	75.39	452.3	576	13824	4.899	2.885
25	78.54	490.8	625	15625	5.	2.924
26	81.68	530.9	676	17576	5.099	2.963
27	84.82	572.5	729	19683	5.196	3.
28	87.96	615.7	784	21952	5.292	3.037
29	91.10	660.5	841	24389	5.385	3.072
30	94.24	706.8	900	27000	5.477	3.107
31	97.39	754.8	961	29791	5.568	3.141
32	100.5	804.2	1024	32768	5.657	3.175
33	103.7	855.3	1089	35937	5.745	3.208
34	106.8	907.9	1156	39304	5.831	3.240
35	110.	962.1	1225	42875	5.916	3.271
36	113.1	1017.9	1296	46656	6.	3.302
37	116.2	1075.2	1369	50653	6.083	3.332
38	119.4	1134.1	1444	54872	6.164	3.362
39	122.5	1194.6	1521	59319	6.245	3.391
40	125.7	1256.6	1600	64000	6.325	3.420
41	128.8	1320.3	1681	68921	6.403	3.448
42	131.9	1385.4	1764	74088	6.481	3.476
43	135.1	1452.2	1849	79507	6.557	3.503
44	138.2	1520.5	1936	85184	6.633	3.530
45	141.4	1590.4	2025	91125	6.708	3.557
46	144.5	1661.9	2116	97336	6.782	3.583
47	147.7	1734.9	2209	103823	6.856	3.609
48	150.8	1809.6	2304	110592	6.928	3.634
49	153.9	1885.7	2401	117649	7.	3.659
50	157.1	1963.5	2500	125000	7.071	3.684
51	160.2	2042.8	2601	132651	7.141	3.708
52	163.4	2123.7	2704	140608	7.211	3.733
53	166.5	2206.2	2809	148877	7.280	3.756
54	169.6	2290.2	2916	157464	7.348	3.780
55	172.8	2375.8	3025	166375	7.416	3.803
56	175.9	2463.0	3136	175616	7.483	3.826
57	179.1	2551.8	3249	185193	7.550	3.849
58	182.2	2642.1	3364	195112	7.616	3.871
59	185.4	2734.0	3481	205379	7.681	3.893
60	188.5	2827.4	3600	216000	7.746	3.915
61	191.6	2922.5	3721	226981	7.810	3.937
62	194.8	3019.1	3844	238328	7.874	3.958
63	197.9	3117.3	3969	250047	7.937	3.979
64	201.1	3217.0	4096	262144	8.	4.
65	204.2	3318.3	4225	274625	8.062	4.021
66	207.3	3421.2	4356	287496	8.124	4.041
67	210.5	3525.7	4489	300763	8.185	4.061
68	213.6	3631.7	4624	314432	8.246	4.082
69	216.8	3739.3	4761	328509	8.307	4.102
70	219.9	3848.5	4900	343000	8.367	4.121
71	223.1	3959.2	5041	357911	8.426	4.141
72	226.2	4071.5	5184	373248	8.485	4.160
73	229.3	4185.4	5329	389017	8.544	4.179
74	232.5	4300.8	5476	405224	8.602	4.198
75	235.6	4417.9	5625	421875	8.660	4.217
76	238.8	4536.5	5776	438976	8.718	4.236
77	241.9	4656.6	5929	465533	8.775	4.254
78	245.0	4778.4	6084	474552	8.832	4.273
79	248.2	4901.7	6241	493039	8.888	4.291
80	251.3	5026.6	6400	512000	8.944	4.309
81	254.5	5153.0	6561	531441	9.	4.327
82	257.6	5281.0	6724	551368	9.056	4.345
83	260.8	5410.6	6889	571787	9.110	4.362
84	263.9	5541.8	7056	592704	9.165	4.379
85	267.0	5674.5	7225	614125	9.220	4.397
86	270.177	5808.8	7396	636056	9.2736	4.4140
87	273.319	5944.7	7569	658503	9.3276	4.4310
88	276.460	6082.1	7744	681472	9.3808	4.4480
89	279.602	6221.1	7921	704969	9.4340	4.4647
90	282.743	6361.7	8100	729000	9.4868	4.4814
91	285.885	6503.9	8281	753571	9.5394	4.4979
92	289.027	6647.6	8464	778688	9.5917	4.5144
93	292.168	6792.9	8649	804357	9.6437	4.5307
94	295.310	6939.8	8836	830584	9.6954	4.5468
95	298.451	7088.2	9025	857375	9.7468	4.5629
96	301.593	7238.2	9216	884736	9.7980	4.5789
97	304.734	7389.8	9409	912673	9.8489	4.5947
98	307.876	7543.0	9604	941191	9.8995	4.6104
99	311.018	7697.7	9801	970299	9.9499	4.6261
100	314.16	7854.0	10000	1000000	10.0000	4.6416

LONG MEASURE (Measures of Length)

Inch		Feet		Yards		Fath.		Inch		Feet
12	=	1						198	=	16½
36	=	3	=	1				7920	=	660
72	=	6	=	2	=	1		63360	=	5280

Feet		Yards		Fath.		Rods		Furl.		Mile
16½	=	5½	=	2¾	=	1				
660	=	220	=	110	=	40	=	1		
5280	=	1760	=	880	=	320	=	8	=	1

6080.26 feet = 1.15 Statute Miles = 1 Nautical Mile or Knot.

SQUARE MEASURE (Measures of Surface)

Sq. Inch		Sq. ft.		Sq. yds.		Sq. rods		Roods		Acre
144	=	1								
1296	=	9	=	1						
39204	=	272¼	=	30¼	=	1				
1568160	=	10890	=	1210	=	40	=	1		
6272640	=	43560	=	4840	=	160	=	4	=	1

640 acres = 1 square mile.

An acre = a square whose side is 69.57 yards or 208.71 feet.

CUBIC MEASURE (Measures of Volume)

Cu. Ins.		Cu. Ft.		Cu. Yd.
1728	=	1		
46656	=	27	=	1

A cord of wood = 128 cubic feet, (4 × 4 × 8 feet.)

42 Cubic feet = a ton of shipping.

1 perch of masonry = 24¾ cubic feet, being 16½ ft. × 1½ ft × 1 ft.

DRY MEASURE

The standard bushel contains 2150.42 cubic inches, or 77.627013 pounds avoirdupois of pure water at maximum density. Its legal dimensions are 18½ inches diameter inside, 19½ inches outside, and 8 inches deep; and when heaped, the cone must be 6 inches high, making a heaped bushel equal to 1¼ truck tons.

Pints		Quarts		Gallons		Pecks		Bushels		Cu. In.
2	=	1	=							67.2
8	=	4	=	1	=					268.8
16	=	8	=	2	=	1	=			537.6
64	=	32	=	8	=	4	=	1	=	2150.42

The British Imperial bushel contains 2218.2 cubic inches and = 1.03 U. S. bushels.

LIQUID OR WINE MEASURE

Gills=7.2187 cu. inches.
4= 1 pint=28.875 cubic inches.
8= 2= 1 quart=57.75 cubic inches.
32= 8= 4= 1 gallon.
2,016= 404= 252= 63=1 hogshead.
4,032=1,008= 504=126=2=1 pipe.
8,064=2,016=1,008=252=4=2=1 ton.

Note.—The standard unit and liquid measure adopted by the U. S. government is the Winchester wine gallon, which contains 231 cubic inches, and holds 8.339 pounds, avoirdupois, of distilled water, at its maximum density weighed in air, the barometer being at 30 inches.

The imperial gallon, adopted by Great Britain, contains 277.274 cubic inches and equals 1.20032 U. S. gallons.

AVOIRDUPOIS OR COMMERCIAL WEIGHT

The grain is the same in Troy, Apothecaries and Avoirdupois weights.

The standard Avoirdupois pound is the weight of 27.7015 cubic inches of distilled water weighed in the air at 39.2 degrees Fahrenheit, barometer at 30 inches. 27.343 grains = 1 drachm.

Drachms		Ozs.		Lbs.		Long Qrs.		Long Cwt.		Long Ton
16	=	1								
256	=	16	=	1						
7168	=	448	=	28	=	1				
28672	=	1792	=	112	=	4	=	1		
573440	=	35840	=	2240	=	80	=	20	=	1

The above table gives what is known as the "long ton." The "short ton" weighs 2000 pounds.

WEIGHT OF WATER

1 cu. in.= .03617 lbs.
12 cu. in.= .0434 lbs.
1 cu. ft. = 7.48052 U. S. gals.
1 U.S. gal.=8.355 lbs.
1.8 cu. ft.= .2240 lbs.
2,240 lbs.=268.8 U. S. gals.

LIQUID WEIGHT

	Lbs. Avoirdupois
1 gal. dist. water=	10
1 gal. sea water=	10.32
1 gal. proof spirits=	9.08

TROY WEIGHT

For gold, silver and precious metals.

Grains	Dwts.	Ozs.	Lbs.
24 =	1		
480 =	20 =	1	
5760 =	240 =	12 =	1

175 pounds Troy = 144 lbs. Avoirdupois.

Pounds Avoirdupois × .82286 =lbs. Troy.

Pounds Troy × 1.2153=lbs. Avoirdupois.

The jewelers' carat is equal, in the United States to 3.2 grains, in London to 3.17 grains, in Paris to 3.18 grains.

WEIGHT OF OILS

	Lbs. Avoirdupois
1 gal. sperm	7½
1 " whale	7½
1 " lard	7½
1 " tallow	7½
1 " neat's-foot	7½
1 " paraffine, 28° grav.	7⅜
1 " paraffine, 25° grav.	7½
1 " reduced Franklin	7¼
1 " castor	8
1 " kerosene	6½

APOTHECARIES WEIGHT

United States and British

Grains	Scr.	Dra.	Ozs.	Lbs.	Lbs. Avoirdupois
20 =	1				
60 =	3 =	1			
480 =	24 =	8 =	1		
5760 =	288 =	96 =	12 =	1	

In Troy and Apothecaries weights, the grain, ounce and pound are the same.

PAPER MEASURE

Quire of Paper....24 sheets.

Ream of paper....20 quires or 480 sheets.

Bundle..... 2 reams.

Bale..... 5 bundles.

Roll of parch.....60 skins.

TABLE OF QUANTITIES

12 units.....1 dozen

12 dozen.....1 gross

20 units.....1 score

24 sheets.....1 quire

20 quires.....1 ream

SHEET OF PAPER FOLDED INTO—

2 leaves is termed folio size.

4	"	"	"	4 to or quarto
8	"	"	"	8 vo. or octavo
12	"	"	"	12 mo. or duodecimo
16	"	"	"	16 mo.
18	"	"	"	18 mo.
24	"	"	"	24 mo.
48	"	"	"	48 mo.

Equivalent Measures

MEASURES OF LENGTH

1 Meter =
- 39.37 inches.
- 3.28083 feet.
- 1.09361 yards.
- 1000. millimeters.
- 100. centimeters.
- 10. decimeters.
- 0.001 kilometers.

1 Centimeter =
- 0.3937 inch.
- 0.0328083 foot.
- 10. millimeters.
- 0.01 meters.

1 Millimeter =
- 39.370 mils.
- 0.03937 inch (or 1/25" nearly).
- 0.001 meter.

1 Kilometer =
- 3280.83 feet.
- 1093.61 yards.
- 0.62137 mile.
- 1000. meters.

1 Mil =
- 0.001 inch.
- 0.02540 millimeter.
- 0.00254 centimeter.

1 Inch =
- 1000. mils.
- 0.0833 foot.
- 0.02777 yard.
- 25.40 millimeters.
- 2.540 centimeters.

1 Foot =
- 12. inches.
- 0.33333 yard.
- 0.0001893 mile.
- 0.30480 meter.
- 30.480 centimeters.

1 Yard =
- 36. inches.
- 3. feet.
- 0.0005681 mile.
- 0.914402 meter.

1 Mile =
- 63360. inches.
- 5280. feet.
- 1760. yards.
- 320. rods.
- 8. furlongs.
- 1609.35 meters.
- 1.60935 kilometers.

MEASURES OF VOLUME AND CAPACITY

1 Cubic Meter =
- 61023.4 cubic ins.
- 35.3145 cubic feet.
- 1.30794 cubic yards.
- 1000. liters.
- 264.170 gallons U. S. liquid=231 cubic ins.

1 Cubic decimeter =
- 61.0234 cubic ins.
- 0.0353145 cubic foot.
- 0.26417 U. S. liquid gallon.
- 1000. cubic centimeters.
- 0.001 cubic meter.

1 Cubic centimeter =
- 0.0000353 cubic foot.
- 0.0610234 cubic inch.
- 1000.0 cubic millimeters.
- 0.001 liter.

1 Cubic millimeter =
- 0.000061023 cubic inch.
- 0.0000000353 cubic foot.
- 0.001 cubic centimeter.

1 Liter =
- 1. cubic decimeter.
- 61.0234 cubic inches.
- 0.353145 cubic foot.
- 1000. cubic centimeters or centiliters.
- 0.001 cubic meter.
- 0.26417 U. S. gallon liquid.
- 1.0567 U. S. quart.
- 2.202 lbs. of water at 62 degrees Fahrenheit.

1 Cubic yard =
- 46656. cubic inches.
- 27. cubic feet.
- 0.76456 cubic meter.

1 Cubic foot =
- 1728. cubic inches.
- 0.03703703 cubic yard.
- 28.317 cubic decimeters or liter.
- 0.028317 cubic meter.
- 7.4805 gallons.

1 Cubic Inch =
- 16.3872 cubic centimeters.

1 Gallon (British) =
- 4.54374 liters.

1 Gallon (U. S.) =
- 3.78543 liters.

MEASURES OF WEIGHT

1 Gram =
- 15.432 grains.
- 0.022046 lbs. (avoir.)
- 0.3527 ozs. (avoir.)

1 Kilogram =
- 1000. grams.
- 2.20462 lbs. (avoir.)
- 35.2739 ozs. (avoir.)

1 Metric ton =
- 2204.62 pounds.
- 0.984206 ton of 2240 pounds.
- 19.68 cwts.
- 1.10231 ton of 2000 pounds.
- 1000. kilograms.

1 Gram =
- 0.064799 grains.

1 Ounce =
- 437.5 grains.
- 0.0625 pounds.
- 28.3496 grams.

1 Pound =
- 7000. grains.
- 16. ounces.
- 453.593 grams.
- 0.453593 kilograms.

1 Ton (2240 pounds) =
- 1.01605 metric tons.
- 1016.05 kilograms.

Equivalent Measures of Surface

1 Circular millimeter =
- .78540 square mils.
- 1.000001 circular inch.
- 0.00064516 circular millimeter.

1 Circular millimeter =
- 1550.0 circular mils.

1 Circular centimeter =
- 155000. circular mils.
- .15500 circular inch.

1 Circular Inch =
- 1000000. circular mils.
- 645.16 circular millimeters.
- 6.4516 circular centimeters.

1 Square meter =
- 1550.0 square inches.
- 10.7639 square feet.
- 1.19598 square yards.
- 10000. square centimeters.

1 Square centimeter =
- 197352. circular mils.
- 0.15500 square inch.
- 0.0001 square meter.

1 Square millimeter =
- 1937.52 circular mils.
- 1550.00 square mils.
- 0.001550 square inch.
- 0.01 square centimeter.

1 Square inch =
- 1000000. square mils.
- 1273240. circular mils.
- 6.45163 square centimeters.
- 645.163 square millimeters.
- 0.006944 square foot.

1 Square foot =
- 144. square inches.
- 0.111111 square yard.
- 0.0929034 square meter.

1 Square yard =
- 9. square feet.
- 1296. square inches.
- 0.836131 square meter.

DECIMAL EQUIVALENTS OF MILLIMETERS

1 millimeter = .03937 inch.

100ths MM	Dec. inch	100ths MM	Dec. inch
1 =	.00039	51 =	.02008
2 =	.0079	52 =	.02047
3 =	.00118	53 =	.02087
4 =	.00157	54 =	.02126
5 =	.00197	55 =	.02165
6 =	.00236	56 =	.02205
7 =	.00276	57 =	.02244
8 =	.00315	58 =	.02283
9 =	.00354	59 =	.02323
10 =	.00394	60 =	.02362
11 =	.00433	61 =	.02402
12 =	.00472	62 =	.02441
13 =	.00512	63 =	.02480
14 =	.00551	64 =	.02520
15 =	.00591	65 =	.02559
16 =	.00630	66 =	.02598
17 =	.00669	67 =	.02638
18 =	.00709	68 =	.02677
19 =	.00748	69 =	.02717
20 =	.00787	70 =	.02756
21 =	.00827	71 =	.02795
22 =	.00866	72 =	.02835
23 =	.00906	73 =	.02874
24 =	.00945	74 =	.02913
25 =	.00984	75 =	.02953
26 =	.01024	76 =	.02992
27 =	.01063	77 =	.03032
28 =	.01102	78 =	.03071
29 =	.01142	79 =	.03110
30 =	.01181	80 =	.03150
31 =	.01220	81 =	.03189
32 =	.01260	82 =	.03228
33 =	.01299	83 =	.03268
34 =	.01339	84 =	.03307
35 =	.01378	85 =	.03346
36 =	.01417	86 =	.03386
37 =	.01457	87 =	.03425
38 =	.01496	88 =	.03465
39 =	.01535	89 =	.03504
40 =	.01575	90 =	.03543
41 =	.01614	91 =	.03583
42 =	.01654	92 =	.03622
43 =	.01693	93 =	.03661
44 =	.01732	94 =	.03701
45 =	.01772	95 =	.03740
46 =	.01811	96 =	.03780
47 =	.01850	97 =	.03819
48 =	.01890	98 =	.03858
49 =	.01929	99 =	.03898
50 =	.01969		

MILLIMETER EQUIVALENTS OF PARTS OF AN INCH

64ths	MM	64ths	MM
1 =	.397	33 =	13.097
2 =	.794	34 =	13.494
3 =	1.191	35 =	13.890
4 =	1.587	36 =	14.287
5 =	1.984	37 =	14.684
6 =	2.381	38 =	15.081
7 =	2.778	39 =	15.478
8 =	3.175	40 =	15.875
9 =	3.572	41 =	16.272
10 =	3.969	42 =	16.669
11 =	4.366	43 =	17.065
12 =	4.762	44 =	17.462
13 =	5.159	45 =	17.859
14 =	5.556	46 =	18.256
15 =	5.953	47 =	18.653
16 =	6.350	48 =	19.050
17 =	6.747	49 =	19.447
18 =	7.144	50 =	19.844
19 =	7.541	51 =	20.240
20 =	7.937	52 =	20.637
21 =	8.334	53 =	21.034
22 =	8.731	54 =	21.431
23 =	9.128	55 =	21.828
24 =	9.525	56 =	22.225
25 =	9.922	57 =	22.622
26 =	10.319	58 =	23.019
27 =	10.716	59 =	23.415
28 =	11.113	60 =	23.812
29 =	11.509	61 =	24.209
30 =	11.906	62 =	24.606
31 =	12.303	63 =	25.003
32 =	12.700	64 =	25.400

10 m/m = 1 centimeter = 0.3937 inches.
10 c/m = 1 decimeter = 3.937 inches.
10 d/m = 1 meter = 39.37 inches.
25.4 m/m = 1 English inch.

Conversion Factors

Weight of Copper .3215 lbs. per cubic inch.

For weight of other metals multiply weight of Copper by:

.95356 for Admiralty Metal.
.90705 " Allegheny Metal.
.30279 " Aluminum.
.91950 " Beryllium Copper.
.98452 " Commercial Bronze.
.98142 " Duronze.
.98142 to 1.0062 for Monel Metal.
.97213 for Nickel Silver 18%.
.97832 " Nickel Silver 30%.
.87616 " Steel.
.94117 " Tobin Bronze.

WROUGHT ALUMINUM

Wt. of 2S = .0979 Lbs. Per Cu. In.

1.01 × wt. of 2S=Weight of 3S
1.03 × wt. of 2S=Weight of 17S
1.03 × wt. of 2S=Weight of 25S
0.99 × wt. of 2S=Weight of 51S
3.06 × wt. of 2S=Weight of Brass
3.2 × wt. of 2S=Weight of Copper
3.2 × wt. of 2S=Weight of Nickel
3.2 × wt. of 2S=Weight of Monel
2.88 × wt. of 2S=Weight of Steel
2.6 × wt. of 2S=Weight of Zinc
2.97 × wt. of { 17S or 25S } =Weight of Brass
3.09 × wt. of 51S=Weight of Brass
0.337 × wt. of Brass=Weight of 17S or 25S
0.324 × wt. of Brass=Weight of 51S
2.84 × wt. of { 17S or 25S } =Weight of Steel
2.91 × wt. of 51S=Weight of Steel
0.352 × wt. of Steel=Weight of 17S or 25S
0.344 × wt. of Steel=Weight of 51S

Aluminum and Aluminum Alloy

TEMPER DESIGNATIONS

2S and 3S temper designations are based on the properties produced by varying amounts of cold work done on the metal after it has been annealed. In the strong alloys the tempers are determined by their condition as regards heat treatment. Each temper is designated by a letter which when subjoined to the symbol for the alloy indicates both the composition and the temper of the material.

2SO—Commercially Pure Wrought Aluminum (soft)
2S 4—Commercially Pure Wrought Aluminum (½ hard)
2SH—Commercially Pure Wrought Aluminum (hard)
3SO—Wrought Aluminum-Manganese Alloy (soft)
3S 4—Wrought Aluminum-Manganese Alloy (½ hard)
3SH—Wrought Aluminum-Manganese Alloy (hard)
17SH—Hard Wrought Temper (cold work)
17SO—Dead Soft (annealed)
17ST—Heat Treated Temper
25SW—As Quenched
25SO—Dead Soft (annealed)
25ST—Heat Treated Temper

Bursting Pressure of Tubes

RULES FOR ESTIMATING SAFE LIMIT OF BURSTING PRESSURE FOR SEAMLESS BRASS AND COPPER TUBING, AND PUMP CYLINDER LININGS, IN POUNDS PER SQUARE INCH

First—Ascertain the tensile strength of the metal in the tube, which varies according to the quality and temper; 40,000 pounds maximum per square inch for brass, and 30,000 pounds maximum per square inch for copper, are considered safe estimates, but not guaranteed.

Second—Multiply the tensile strength by the thickness of the metal in inches, or decimal parts of an inch.

Third—Divide by the radius (one-half of the diameter), expressed in inches, and the result will show the pressure in pounds per square inch.

A safety factor of six (6) being allowed, divide the above result by six (6). Example: A tube 4 inches outside diameter, No. 8 B. and S. gauge, made of brass, having 40,000 per square inch tensile strength, shows 428 pounds pressure per square inch.

EXAMPLE:
½ diam. of 4-in. tube = 2 in.
Factor of Safety, of 6

40,000 lbs. per square inch.
.1284 or No. 8 B. and S. thick.
)5136.0000
)2568.0000
428 lbs. pressure per sq. in.

To Find the Bursting Pressure of a Seamless Brass or Copper Tube

Double the gauge in thousandths of an inch; multiply by 35.000 to 40.000 for brass, and 28.000 to 30.000 for copper; divide the product by the internal diameter; divide by the factor of safety chosen—usually from 4 to 8, average factor 6—Government use about 10 or 12.

To Find the Approximate Weight of One Foot of Brass or Copper Tubing

To determine the amount of material in cubic inches or parts thereof in the walls of any seamless tube, of which the inside and outside diameters are known; multiply the mean diameter in inches or decimal parts of an inch by 3.1416, and the result by the thickness in decimal parts of an inch, multiplied by the length in inches; the result being the number of cubic inches and this sum multiplied by .3069 for brass or .3227 for copper, will give the weight in pounds. The mean diameter is outside diameter, plus inside diameter divided by 2.

EXAMPLE: Determine the weight of 1 foot of seamless brass tubing 9 inches inside diameter by No. 9 Stubs' gauge—(No. 9 Stubs' gauge=.148) ×2=.296 plus 9-inch inside=9.296 outside diameter.

9.296+9=18.296÷2=9.148= mean diameter: 9.148×3.1416=28.7393×12-inch=344.8722×.148 (decimal of gauge=51.0390 cubic inches×.3069 pounds per cubic inch for brass equals 15.664 pounds.

Useful Methods for Calculating Weights—There are several methods which may often be used to advantage in determining weights of odd-sized bars not included in our tables.

To find the weight per foot of any size round, square or octagon, square the diameter (or stated dimension) and multiply by the weight per foot of 1 inch round, square or octagon, respectively.

The weight per foot of octagon may be found by multiplying the weight per foot of a round bar of the same size by 1.0547.

The weight per foot of hexagon may be found by multiplying the weight per foot of a round bar of the same size by 1.1026.

To find the weight per foot of any flat, multiply the product of the width and thickness by the weight per foot of 1 inch square.

The weight per foot of square may be found by multiplying the weight per foot of round bar of the same size by 1.273.

Table Showing Price Each and Price Per Dozen

Where Cost Is Per Gross.

Cost per Gross	Cost per Each	Cost per Doz.	Cost per Gross	Cost per Each	Cost per Doz.	Cost per Gross	Cost per Each	Cost per Doz.	Cost per Gross	Cost per Each	Cost per Doz.	Cost per Gross	Cost per Each	Cost per Doz.	Cost per Gross	Cost per Each	Cost per Doz.
.01	.00007	.00083	.46	.00319	.03833	.91	.00632	.07583	2.80	.01944	.2333	5.05	.03506	.4208	7.30	.05069	.6083
.02	.00014	.00167	.47	.00326	.03917	.92	.00639	.07667	2.85	.01979	.2375	5.10	.03541	.425	7.35	.05104	.6125
.03	.00020	.0025	.48	.00333	.04	.93	.00646	.075	2.90	.02013	.2417	5.15	.03576	.4291	7.40	.05139	.6166
.04	.00028	.00333	.49	.00340	.04083	.94	.00653	.07583	2.95	.02048	.2458	5.20	.03611	.4333	7.45	.05173	.6208
.05	.00035	.00417	.50	.00347	.04167	.95	.00660	.07917	3.00	.02083	.25	5.25	.03646	.4375	7.50	.05208	.6250
.06	.00042	.0050	.51	.00354	.04250	.96	.00666	.080	3.05	.02118	.2542	5.30	.03680	.4416	7.55	.05243	.6291
.07	.00049	.00583	.52	.00361	.04333	.97	.00674	.08083	3.10	.02153	.2583	5.35	.03715	.4458	7.60	.05277	.6333
.08	.00056	.00667	.53	.00368	.04416	.98	.00681	.081667	3.15	.02187	.2625	5.40	.03750	.45	7.65	.05312	.6375
.09	.00062	.0075	.54	.00375	.045	.99	.00687	.0825	3.20	.02222	.2667	5.45	.03784	.4541	7.70	.05347	.6416
.10	.00069	.00833	.55	.00382	.04583	1.00	.00694	.08333	3.25	.02257	.2708	5.50	.03819	.4583	7.75	.05382	.6458
.11	.00076	.0092	.56	.00389	.04667	1.05	.00729	.0875	3.30	.02292	.2750	5.55	.03854	.4625	7.80	.05416	.65
.12	.00083	.010	.57	.00396	.0475	1.10	.00764	.09166	3.35	.02326	.2792	5.60	.03889	.4666	7.85	.05451	.6541
.13	.00092	.01083	.58	.00403	.04833	1.15	.00799	.09583	3.40	.02361	.2833	5.65	.03923	.4708	7.90	.05486	.6583
.14	.00097	.01167	.59	.00410	.04916	1.20	.00833	.10	3.45	.02396	.2875	5.70	.03958	.475	7.95	.05520	.6625
.15	.00104	.0125	.60	.00417	.05	1.25	.00868	.1042	3.50	.02430	.2917	5.75	.03993	.4791	8.00	.05555	.6666
.16	.00111	.01333	.61	.00424	.05083	1.30	.00927	.1083	3.55	.02465	.2958	5.80	.04028	.4833	8.05	.05590	.6708
.17	.00118	.01417	.62	.00431	.05167	1.35	.00937	.1125	3.60	.025	.30	5.85	.04062	.4875	8.10	.05625	.675
.18	.00125	.015	.63	.00437	.0525	1.40	.00972	.1167	3.65	.02535	.3042	5.90	.04096	.4916	8.15	.05659	.6791
.19	.00132	.01583	.64	.00444	.05333	1.45	.01007	.1203	3.70	.02569	.3083	5.95	.04131	.4958	8.20	.05694	.6833
.20	.00139	.01667	.65	.00451	.05417	1.50	.01042	.125	3.75	.02604	.3125	6.00	.04166	.50	8.25	.05729	.6875
.21	.00146	.0175	.66	.00458	.055	1.55	.01076	.1292	3.80	.02639	.3167	6.05	.04201	.5041	8.30	.05764	.6916
.22	.00153	.01833	.67	.00465	.05583	1.60	.01110	.1333	3.85	.02673	.3208	6.10	.04236	.5083	8.35	.05798	.6958
.23	.00159	.01917	.68	.00472	.05667	1.65	.01146	.1375	3.90	.02708	.325	6.15	.04271	.5125	8.40	.05833	.70
.24	.00167	.02	.69	.00479	.05750	1.70	.01180	.1417	3.95	.02743	.3292	6.20	.04305	.5166	8.45	.05868	.7041
.25	.00174	.02083	.70	.00486	.05833	1.75	.01215	.1458	4.00	.02778	.3333	6.25	.04340	.5208	8.50	.05902	.7083
.26	.00181	.02167	.71	.00493	.05917	1.80	.0125	.1500	4.05	.02812	.3375	6.30	.04375	.525	8.55	.05937	.7125
.27	.00187	.02250	.72	.0050	.06	1.85	.01285	.1542	4.10	.02847	.3417	6.35	.04409	.5291	8.60	.05972	.7166
.28	.00194	.02333	.73	.00507	.06083	1.90	.01319	.1583	4.15	.02882	.3458	6.40	.04444	.5333	8.65	.06007	.7208
.29	.00201	.02417	.74	.00514	.06167	1.95	.01354	.1625	4.20	.02916	.35	6.45	.04479	.5375	8.70	.06041	.725
.30	.00208	.0250	.75	.00521	.0625	2.00	.01389	.1667	4.25	.02951	.3542	6.50	.04514	.5416	8.75	.06076	.7291
.31	.00215	.02583	.76	.00528	.06333	2.05	.01423	.1708	4.30	.02986	.3583	6.55	.04548	.5458	8.80	.06111	.7333
.32	.00222	.02667	.77	.00535	.06416	2.10	.01458	.175	4.35	.03021	.3625	6.60	.04583	.55	8.85	.06145	.7375
.33	.00229	.02750	.78	.00542	.0650	2.15	.01492	.1792	4.40	.03055	.3667	6.65	.04618	.5541	8.90	.06180	.7416
.34	.00236	.02833	.79	.00549	.06583	2.20	.01527	.1833	4.45	.03090	.3708	6.70	.04652	.5583	8.95	.06215	.7458
.35	.00243	.02917	.80	.00556	.06667	2.25	.01562	.1875	4.50	.03125	.375	6.75	.04687	.5625	9.00	.0625	.75
.36	.00250	.03	.81	.0056	.0675	2.30	.01597	.1917	4.55	.0316	.3792	6.80	.04722	.5666	9.10	.0632	.7583
.37	.00257	.03083	.82	.00569	.06833	2.35	.01632	.1958	4.60	.03194	.3833	6.85	.04757	.5708	9.20	.0639	.7667
.38	.00264	.03167	.83	.00576	.06917	2.40	.01667	.20	4.65	.03229	.3875	6.90	.04791	.575	9.30	.0646	.750
.39	.00271	.0325	.84	.00583	.07	2.45	.01701	.2042	4.70	.03264	.3917	6.95	.04826	.5791	9.40	.0653	.7583
.40	.00278	.03333	.85	.00590	.07083	2.50	.01736	.2083	4.75	.03298	.3958	7.00	.04861	.5833	9.50	.0660	.7917
.41	.00285	.03417	.86	.00597	.07167	2.55	.01771	.2125	4.80	.03333	.40	7.05	.04896	.5875	9.60	.0666	.8000
.42	.00292	.0350	.87	.00604	.0725	2.60	.01805	.2167	4.85	.03368	.4042	7.10	.04930	.5916	9.70	.0674	.8083
.43	.00299	.03583	.88	.00611	.07333	2.65	.01840	.2208	4.90	.03403	.4083	7.15	.04965	.5958	9.80	.0681	.8167
.44	.00306	.03667	.89	.00618	.07417	2.70	.01875	.225	4.95	.03437	.4125	7.20	.05	.60	9.90	.0687	.8250
.45	.00312	.03750	.90	.00625	.075	2.75	.01910	.2292	5.00	.03472	.4167	7.25	.05034	.6041	10.00	.0694	.8333

Explanation of Wire Gauges

BROWN & SHARPE gauge is used for sheet brass, aluminum, bronze and nickel silver; brass, copper, nickel silver and aluminum wire.

BIRMINGHAM or STUBS' IRON WIRE gauge is used for steel bands and hoops, cold rolled strip steel, cold rolled sheet copper, and seamless brass, bronze, copper and steel tubing.

WASHBURN & MOEN gauge is used for cold drawn steel wire.

U. S. STANDARD gauge is used for stainless steel, hot rolled sheet steel, either plain, galvanized or tinned.

MUSIC WIRE gauge is used for steel music or piano wire. The table given is for the gauge used by the American Steel & Wire Co. Several other music wire gauges are in partial use, and differ slightly from the one given.

ZINC gauge is used for sheet zinc, nickeloid and chromaloid.

STUBS WIRE GAUGES—In using the gauges known as Stubs' Gauges, there should be constantly borne in mind the difference between the Stubs' Iron Wire Gauge and the Stubs' Steel Wire Gauge.

The Stubs' Iron Wire Gauge is the one commonly known as the English Standard Wire, or Birmingham Gauge and designates the Stubs' soft wire sizes.

The Stubs' Steel Wire Gauge is the one that is used in measuring drawn steel wire or drill rods of Stubs make and is also used by many makers of American drill rods.

Comparison of Wire Gauges

Gauge No.	American or Brown & Sharpe's	Birmingham or Stubs'	Washburn & Moen	Imperial S. W. G.	London or Old English	United States Standard	M. & H. Zinc Gauge	Gauge No.
0000000	.....	.....	.4900	.500	.....	.500	.....	0000000
000000	.5800	.....	.4615	.464	.....	.46875	.....	000000
00000	.5165	.....	.4305	.432	.....	.4375	.....	00000
0000	.4600	.454	.3938	.400	.454	.40625	.....	0000
000	.4096	.425	.3625	.372	.425	.375	.....	000
00	.3648	.380	.3310	.348	.380	.34375	.....	00
0	.3249	.340	.3065	.324	.340	.3125	.....	0
1	.2893	.300	.2830	.300	.300	.28125	.....	1
2	.2576	.284	.2625	.276	.284	.265625	.....	2
3	.2294	.259	.2437	.252	.259	.25	.006	3
4	.2043	.238	.2253	.232	.238	.234375	.008	4
5	.1819	.220	.2070	.212	.220	.21875	.010	5
6	.1620	.203	.1920	.192	.203	.203125	.012	6
7	.1443	.180	.1770	.176	.180	.1875	.014	7
8	.1285	.165	.1620	.160	.165	.171875	.016	8
9	.1144	.148	.1483	.144	.148	.15625	.018	9
10	.1019	.134	.1350	.128	.134	.140625	.020	10
11	.09074	.120	.1205	.116	.120	.125	.024	11
12	.08081	.109	.1055	.104	.109	.109375	.028	12
13	.07196	.095	.0915	.092	.095	.09375	.032	13
14	.06408	.083	.0800	.080	.083	.078125	.036	14
15	.05707	.072	.0720	.072	.072	.0703125	.040	15
16	.05082	.065	.0625	.064	.065	.0625	.045	16
17	.04526	.058	.0540	.056	.058	.05625	.050	17
18	.04030	.049	.0475	.048	.049	.05	.055	18
19	.03589	.042	.0410	.040	.040	.04375	.060	19
20	.03196	.035	.0348	.036	.035	.0375	.070	20
21	.02846	.032	.0317	.032	.0315	.034375	.080	21
22	.02535	.028	.0286	.028	.0295	.03125	.090	22
23	.02257	.025	.0258	.024	.0270	.028125	.100	23
24	.02010	.022	.0230	.022	.0250	.025	.125	24
25	.01790	.020	.0204	.020	.0230	.021875	.....	25
26	.01594	.018	.0181	.018	.0205	.01875	.....	26
27	.01420	.016	.0173	.0164	.01875	.0171875	.....	27
28	.01264	.014	.0162	.0148	.01650	.015625	.....	28
29	.01126	.013	.0150	.0136	.01550	.0140625	.....	29
30	.01003	.012	.0140	.0124	.01375	.0125	.....	30
31	.008928	.010	.0132	.0116	.01225	.0109375	.....	31
32	.007950	.009	.0128	.0108	.01125	.01015625	.....	32
33	.007080	.008	.0118	.0100	.01025	.009375	.....	33
34	.006305	.007	.0104	.0092	.00950	.00859375	.....	34
35	.005615	.005	.0095	.0084	.00900	.0078125	.....	35
36	.005000	.004	.0090	.0076	.00750	.00703125	.....	36
37	.004453	.....	.0085	.0068	.00650	.006640625	.....	37
38	.003965	.....	.0080	.0060	.00575	.00625	.....	38
39	.003531	.....	.0075	.0052	.00500	.....	.....	39
40	.003145	.....	.0070	.0048	.00450	.....	.....	40
41	.002800	.....	.0066	.0044	.....	.....	.....	41
42	.002494	.....	.0062	.0040	.....	.....	.....	42
43	.002221	.....	.0060	.0036	.....	.....	.....	43
44	.001978	.....	.0058	.0032	.....	.....	.....	44
45	.001761	.....	.0055	.0028	.....	.....	.....	45
46	.001568	.....	.0052	.0024	.....	.....	.....	46
47	.001397	.....	.0050	.0020	.....	.....	.....	47
48	.001244	.....	.0048	.0016	.....	.....	.....	48
49	.001018	.....	.0046	.0012	.....	.....	.....	49
50	.0009863	.....	.0044	.0010	.....	.....	.....	50

Fractions of An Inch, Decimal & Millimeter Equivalents

Inch	Inch	MM.
1/64	.015625	.397
1/32	.03125	.794
3/64	.046875	1.191
1/16	.0625	1.587
5/64	.078125	1.984
3/32	.09375	2.381
7/64	.109375	2.778
1/8	.125	3.175
9/64	.140625	3.572
5/32	.15625	3.969
11/64	.171875	4.366
3/16	.1875	4.762
13/64	.203125	5.159
7/32	.21875	5.556
15/64	.234375	5.953
1/4	.250	6.350
17/64	.265625	6.747
9/32	.28125	7.144
19/64	.296875	7.541
5/16	.3125	7.937
21/64	.328125	8.334
11/32	.34375	8.731
23/64	.359375	9.128
3/8	.375	9.525
25/64	.390625	9.922
13/32	.40625	10.319
27/64	.421875	10.716
7/16	.4375	11.113
29/64	.453125	11.509
15/32	.46875	11.906
31/64	.484375	12.303
1/2	.500	12.700
33/64	.515625	13.097
17/32	.53125	13.494
35/64	.546875	13.890
9/16	.5625	14.287
37/64	.578125	14.684
19/32	.59375	15.081
39/64	.609375	15.478
5/8	.625	15.875
41/64	.640625	16.272
21/32	.65625	16.669
43/64	.671875	17.065
11/16	.6875	17.462
45/64	.703125	17.859
23/32	.71875	18.256
47/64	.734375	18.653
3/4	.750	19.050
49/64	.765625	19.447
25/32	.78125	19.844
51/64	.796875	20.240
13/16	.8125	20.637
53/64	.828125	21.034
27/32	.84375	21.431
55/64	.859375	21.828
7/8	.875	22.225
57/64	.890625	22.622
29/32	.90625	23.019
59/64	.921875	23.415
15/16	.9375	23.812
61/64	.953125	24.209
31/32	.96875	24.606
63/64	.984375	25.003
	1.0000	25.400